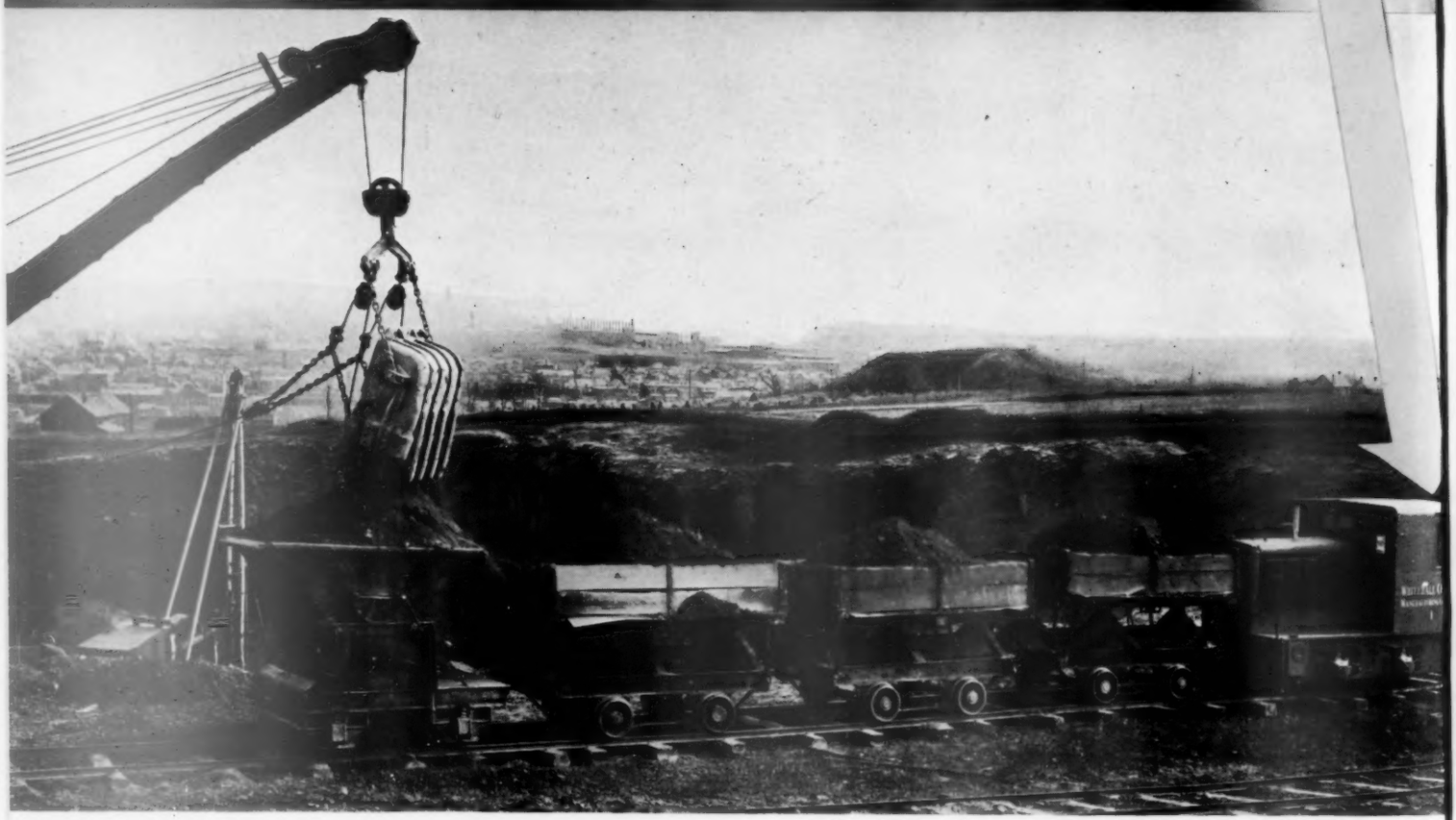
PIT AND QUARRY

NOVEMBER, 1939

Dam Aggregates Plant . . . Lone Star Installs Direct-Firing Coal Mills at Limedale
Plant Produces Seven Million Blocks Yearly . . . The Effect of the War on Construction

A GALLON AN HOUR PROVIDES ITS POWER



A single gallon of low-cost fuel per hour is all this "Caterpillar" Diesel-powered Vulcan locomotive requires to shuttle its string of five-ton cars on overburden-removal work for one of America's large cement companies.

Yet, it is only one of many examples of the extremely low-cost power "Caterpillar" Diesel Engines are delivering for the quarrying industries: In locomotives for rail-hauling; in tractors for pushing bulldozers or pulling scrapers and wagons; in machinery for rock-crushing and gravel-screening; in air compressors for drilling; in shovels and draglines for excavating . . . no matter what the application or requirements, these sturdy power-plants are setting up records everywhere for operating economy and dependable going—24 hours a day if necessary, month in and month out.

In behalf of profit increasing, there is so much to be said on the superiorities of "Caterpillar" Diesel Engines that it will pay you to get detailed facts-and-figures at once. See your nearest "Caterpillar" dealer or write to us direct, giving us a general idea of your power requirements.

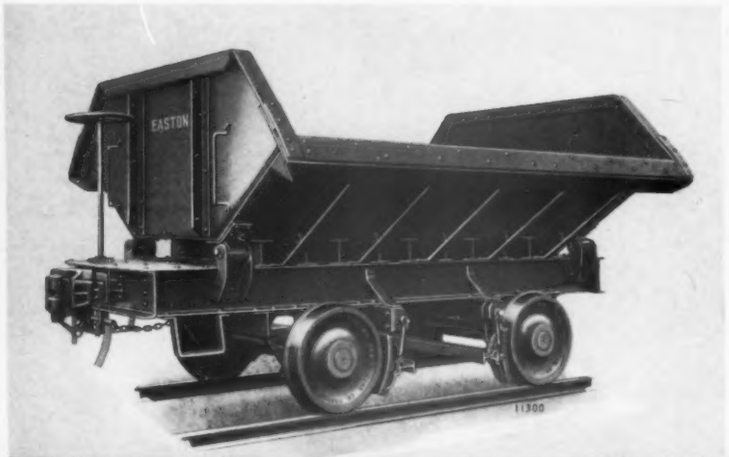
CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS

CATERPILLAR

REG. U.S. PAT. OFF.

DIESEL ENGINES · TRACK TYPE TRACTORS · ROAD MACHINERY

When you OVERHAUL your HAULAGE SYSTEM aim for



EASTON PHOENIX QUARRY CAR

Bigger Payloads

You're losing profits through smaller payloads when your present equipment can't compete with the more efficient service of modern haulage units. Why not aim for Bigger Payloads with Easton?

PHOENIX A patented two-way side-dump container. Hundreds of Phoenix cars are in service in quarries throughout the world. The patented Phoenix design, developed through twenty-five years of painstaking research has recently proved sensationally popular in application to semi-trailer haulage. Investigate Phoenix cars, truck bodies or trailers first.

WON WAY Another name made famous by years of reliable quarry service. The patented Won Way, a one-way, side or end dump container, is available in many variations for rail, truck body and trailer haulage.

EASTON PHOENIX SEMI-TRAILER

• • •

Hundreds of other types of rock handling containers have been pioneered and developed by Easton engineers. No matter what capacity you require, or what make or type of locomotive, truck or tractor you employ, the Easton Engineering Service aims to help you select the right containers for *more profitable tonnage* in every load. Consult Easton now for Bigger Payloads.

EASTON WON WAY QUARRY CAR

EASTON WON WAY TRUCK BODY

EASTON CAR & CONSTRUCTION COMPANY, EASTON, PA.

ALL TYPES OF CARS, TRUCK BODIES, AND TRAILERS FOR ROCK HANDLING

PIT AND QUARRY, November, 1939. Vol. 32, No. 5. Published monthly by the Complete Service Publishing Company, 538 South Clark Street, Chicago, Ill. Subscription price $1 for 1 year in the U. S. and possessions, Canada, Central and South America; elsewhere $1 additional for each year. Single copies 20 cents. Entered as second-class matter February 28, 1932, at the Post Office at Chicago, Ill., under the act of March 3, 1897.

The candid camera shows ATLAS EXPLOSIVES at work!

1 The Onondaga County Quarry, Jamesville, N. Y.

2 The toe comes first. No explosive energy wastes into the air. A beautifully controlled shot!

3 An instant later—everything under control.

These remarkable, unretouched photographs tell the story of a routine Atlas blasting operation. They constitute a graphic record of an ideal shot—typical of the control developed by the combination of Atlas Methods, Atlas Electric Blasting Caps and Atlas Explosives. The photographs show no geyser effects of holes blown out. The explosive gases are working quietly behind the burden to use all explosive energy without waste.

4 A fine feast for a shovel—neatly laid down close to the face.

ATLAS POWDER COMPANY, WILMINGTON, DEL.

Cable Address—Atpowco

Everything for Blasting

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ATLAS

EXPLOSIVES

CHEMICALS ATLAS EXPLOSIVES

New 1¾ YD. LORAIN 80

• Test first and talk later was the policy back of the Lorain-80's development. So, without any fanfare or ballyhoo, Lorain-80's went to work in 13 states on such jobs as the Virginia Skyline and the Pennsylvania Turnpike. Over a period of months—not weeks—these machines have had their teeth in every kind of digging—been subjected to every known test their owners could think of to prove their power, speed and strength.

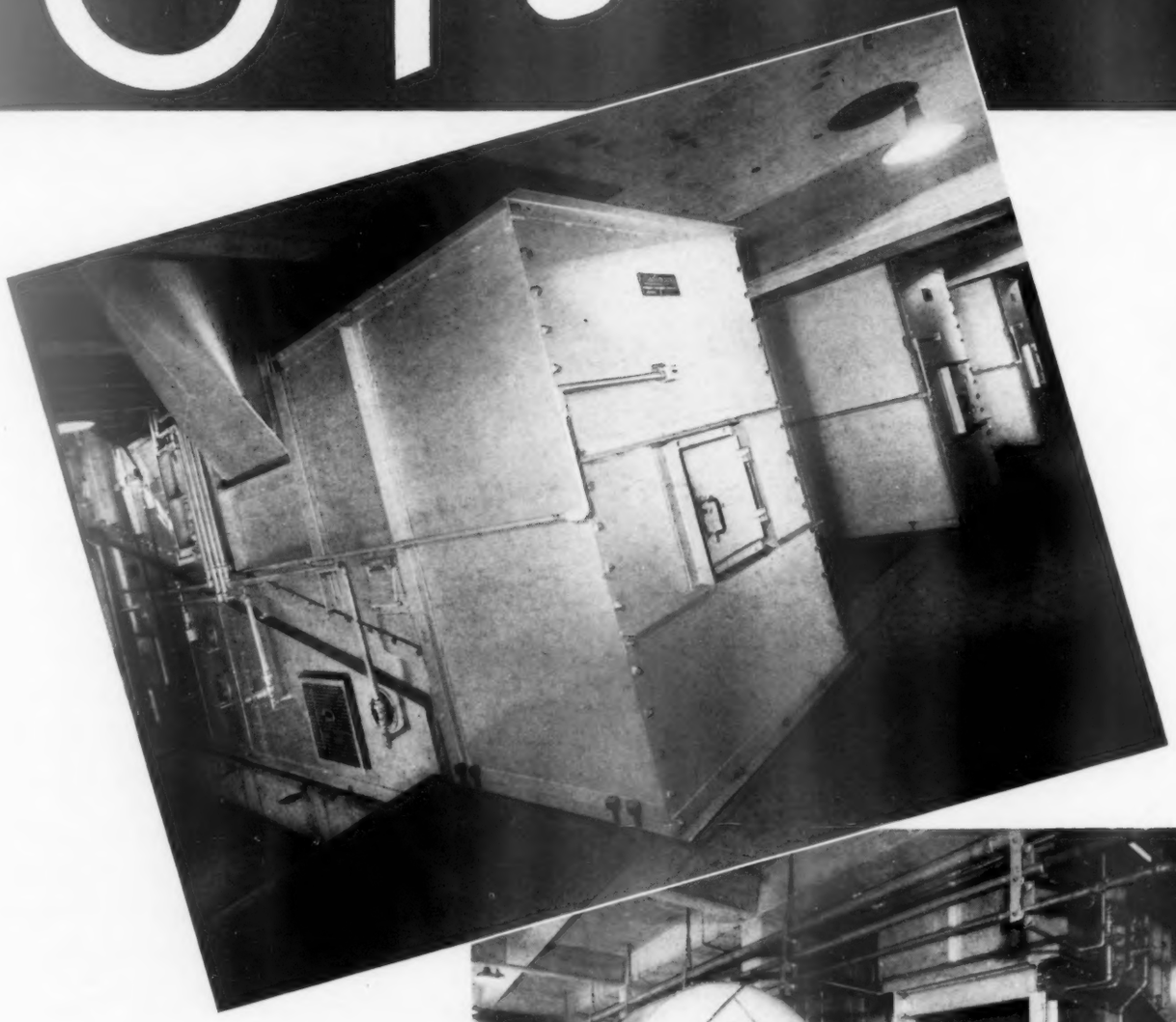
What's the verdict? Just ask the owners of these Lorain-80's. They've got figures and facts galore that bear out our original hunch —Lorain has again produced a "winner."

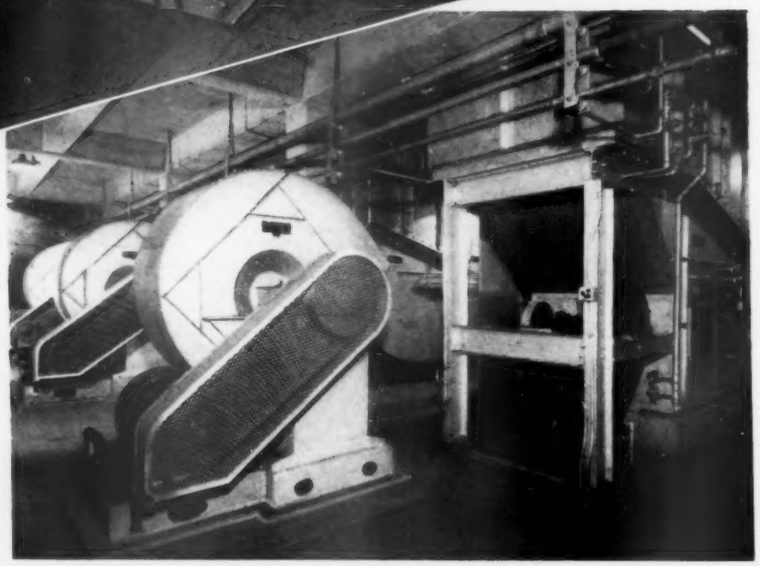
Write for list of these owners and copy of catalog describing the new features of the 1¾-yd. Lorain-80.

THE THEW SHOVEL COMPANY
LORAIN, OHIO

THEW CENTER DRIVE

3 FULLER





Above: Three Fuller Coolers showing discharge ends.

Right: Drives and fans installed on these same coolers.

FULLER COMPANY

CHICAGO—1118 Marquette Bldg.

AIR-QUENCHING COOLERS

IN SERVICE

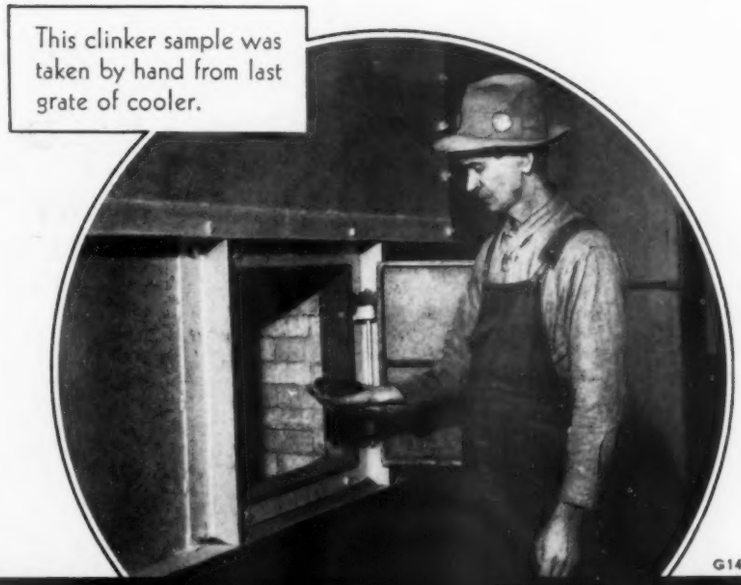
and now

5 More

units purchased for installation in two other plants of the same Portland cement company.

FEATURES OF
FULLER AIR-QUENCHING COOLER

- Abrupt chilling for production of clinker of high glass content
- Mechanically simple; requires comparatively little maintenance
- Grates are water cooled; fixed grates alternate with moving grates
- High and uniform combustion air temperatures
- Operation under direct observation at all times
- Drive mechanism simple; outside of cooler
- Low power requirements



G14T

CATASAUQUA, PA.

SAN FRANCISCO—320 Chancery Bldg.

BUCYRUS ERIE

Announces the new... 2½ yard... 54-B

Big Machine STRENGTH Small Machine SPEEDS!

Diesel

SHOVEL-DRAGLINE-CRANE

The only machine of this size with conical hook swing rollers in double-flanged roller path . . . independent power - controlled boom hoist . . . swing clutches that are revolutionary in simplicity and smoothness of operation . . . special "swampcat" mountings for dragline service . . . quarry-type shovel front-end . . . fast, long-range dragline . . . ships on most U. S. railroads without major dismantling. Available also electrically driven — single motor or 3-motor with Ward Leonard Control. Write for full details on the new 2½-yard leader.

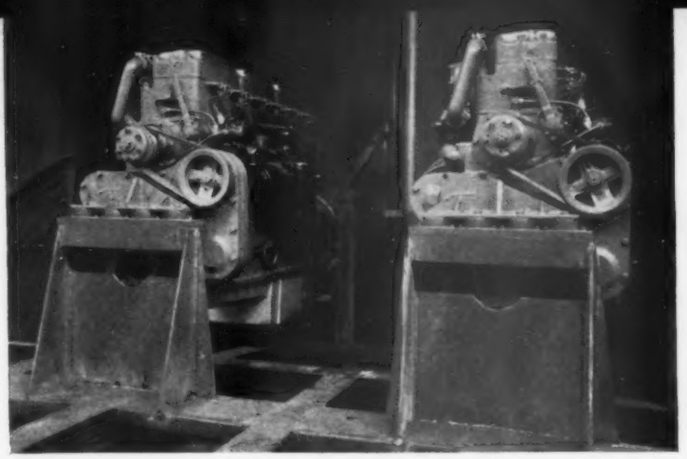
A matchless combination of power, strength, speed and operating ranges.

"Years Ahead" design combining features which have been thoroughly field developed and proven by unmatched performance of the 120-B and 10-B groups of Bucyrus-Eries. Outstanding, modern, destined to be imitated, the new 54-B is revolutionary in its ability to deliver big, low-cost output in the toughest digging. Find out now what 54-B performance can mean to your pocketbook.

D-28

Bucyrus·Erie

SOUTH MILWAUKEE, WISCONSIN



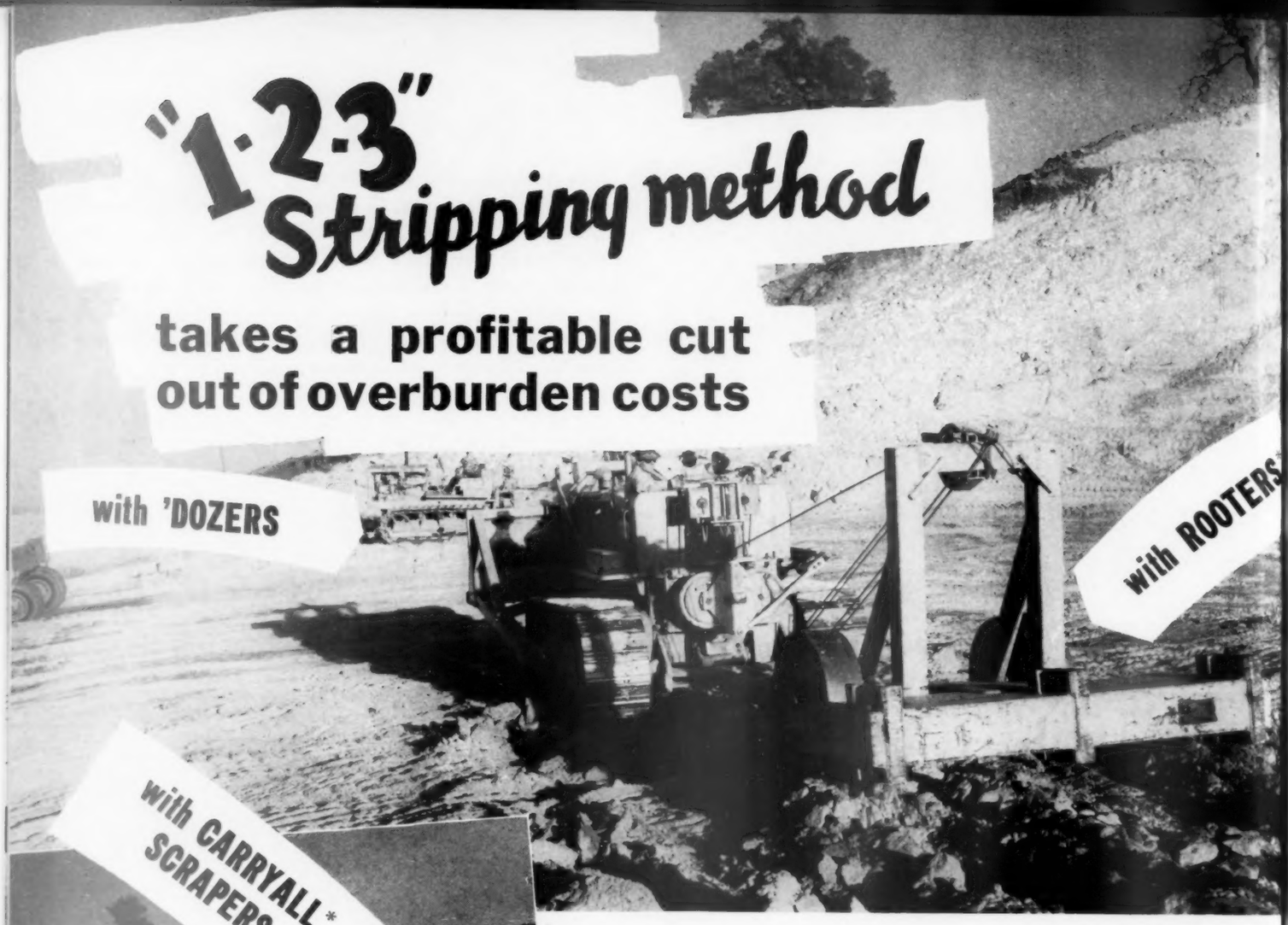
★ The Snow Cruiser—a moving research base, has to provide housing—light—warmth—food and transportation for a crew of four scientists for long periods without outside contact. The power plant had to have a record for dependability established through thousands of similar units already in operation. The engines must be instant starting, readily adaptable to frigid climates—smooth and flexible—simple and easy to maintain and service. One engine met all the specifications—the Cummins Dependable Diesel. Send for complete details. Cummins Engine Company, SC16 Wilson Steet, Columbus, Indiana.

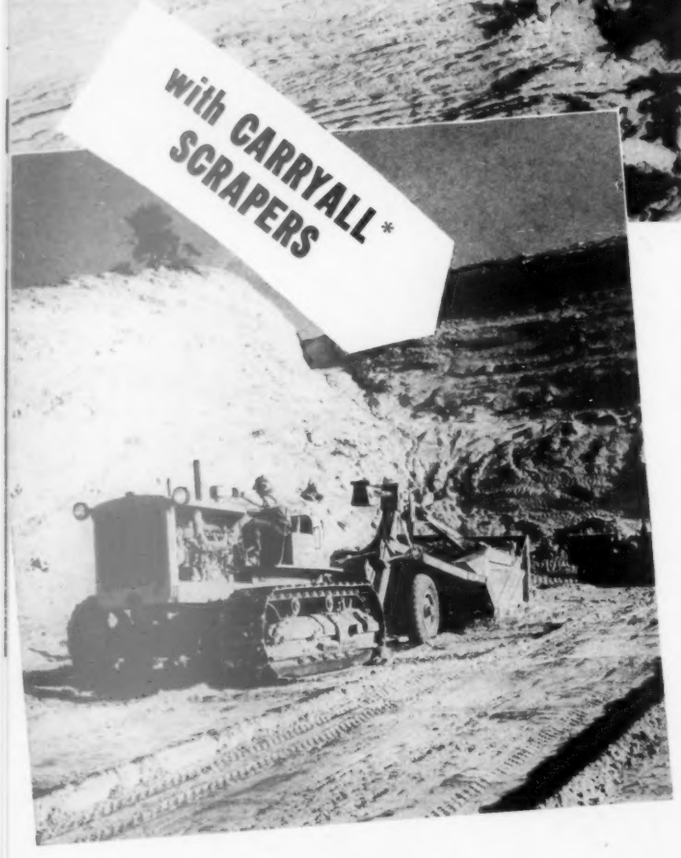
SNOW CRUISER

ANTARCTIC EXPEDITION • RESEARCH FOUNDATION OF ARMOUR INSTITUTE OF TECHNOLOGY • PROJECT No. 1-69

"1-2-3" Stripping method

takes a profitable cut out of overburden costs





180,000 yards of overburden moved at typical tractor tool economies! A few years back stripping expense would have made recovery prohibitive at the Silica Sand Company's (of California) Brentwood pit. But what a difference a few years make in excavation costs . . . means and methods!

Three LeTourneau 8-Yard Carryall Scrapers, behind D7 "Cats" are stripping 20 hours a day with landslide proportions. At the same time, the Carryalls waste the overburden *permanently* out of the way at a final low excavation, hauling and placement cost that knocks rehandling expense completely out of the picture.

On the short hauls, two LeTourneau Bulldozers save Carryall time, in addition to general pit clean-up . . . and when rock-like formations are bared, one 'Dozer-equipp tractor hooks onto a LeTo neau Rooter,* which gives p fect breakage—at *one-third* cost of blasting—to *keep* p duction in this lowest " 'Dozer and Carryall class.

This LeTourneau "1-2- stripping method, you know as economical to operate maintain as it is simple application. Each tool is chanically cable-controlled each is interchangeable on standard Power Unit. Th tractor tool investment is up only in direct proportion its usefulness!

. . . tell your LeTourneau "Caterpillar" dealer to de onstrate how that will cut y stripping to the lowest possi cost per yard. R. G. LeTOU NEAU, INC., Peoria, Ill., Sto ton, Calif.

CARRYALL* SCRAPERS, ANGLEDOZERS*, BULLDOZERS, ROOTERS*, POWER CONTROL UNITS, DRAG SCRAPERS, PUSHDOZERS, SHEEP'S FOOT ROLLERS, CRANES, TREEDOZERS. *Name Reg. U.S. Pat. Off.

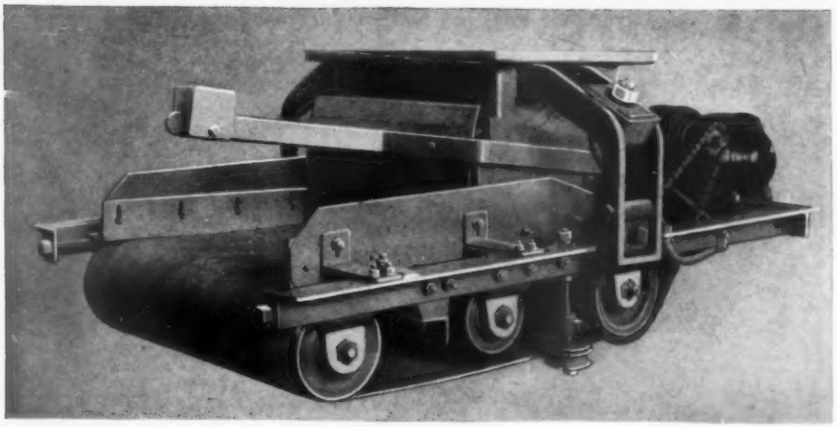
LETOURNEAU

Stripping EQUIPMEN

PRINT IN BL

HARDINGE

CONSTANT WEIGHT FEEDER



the Cost Killer!

What *Others* Have Said

"SINCE the introduction of this feeder, the capacity of the Ball Mill is increased about 20%."

"If we had known as much about Constant Weight Feeders when we built our mill as we do now, all feeders would have been of the Constant Weight Type."

"Since the installation was made, it has been possible to reduce the operating labor by one man per shift."

"This feeder has been very satisfactory . . . requires little or no attention—it is very sensitive and, therefore, accurate and upkeep is practically nil."

Investigate this Profit-Making Feeder. Get full data. Write for Bulletins 33-C and 41.

Hardinge Sets the Pace

HARDINGE

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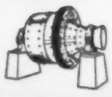

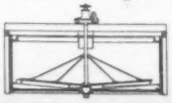

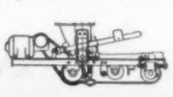
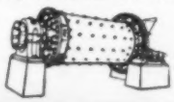

CONICAL MILLS | COUNTER CURRENT CLASSIFIERS | THICKENERS CLARIFIERS | RUGGLES-COLES DRYERS | CONSTANT WEIGHT FEEDERS | TUBE ROD AND BATCH MILLS

New 1940 Edition

HANDBOOK OF PLANT LAYOUT

FREE
GET YOUR COPY NOW

● There is always *something new* in plant layout! Important changes in road building and construction requirements mean new specifications . . . new methods. And of course, new equipment . . . improved plant design to meet these trends . . . modernization that makes money. These are all things you want to KNOW about.

Here's *the* book that tells you. Not a machinery catalog—not at all. A complete collection of quarry plant layouts of every type. From the simplest one-crusher set-up to the elaborate three-crusher outfits—stationary, portable, semi-portable. Practical, understandable diagrams, without any unnecessary high-hat engineering gingerbread.

How can you get extra capacity? extreme flexibility? a particular size or sizes? advantages of permanency with portability? ability to handle tough, abrasive rock? Get the answers to *all* such questions in brief, accurate, fact-and-figure form.

Get your copy now! Ask for Bulletin QP-15.

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504 E. CAPITOL DRIVE . MILWAUKEE, WIS.

TELSMITH *Quarry Plants*

Through and Through—a
QUARRY SHOVEL
CHECK it over—a husky front end—all welded boom (and no Northwest Welded Boom has ever failed) Dipper sticks that stand the gaff—tied together with a heavy cap casting at the inner ends to increase resistance to twisting strains—no racks or pinions to wear out.
The Dual Crowd—simple, powerful—a combination of Northwest Independent Crowd plus an additional force for crowding that other shovels waste—a crowd that makes handling rock faster and easier.
Power—for the maximum job to be done—slow speed power that hangs on when the peak load is hit—the answer to the job that calls for lugging ability.
Mobility—a crawler that has been time tested in quarry work—load is distributed over small crawler rollers—no chance of jamming up on a rock and holding up re-location.
Add to this ball or roller bearings on all high speed shafts, the "feather-touch" control, the Cushion Clutch and many other Northwest refinements. You should know about these things before you buy. Let us send you complete details.
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THE LOUISVILLE TYPE L DRYER IS MUCH MORE EFFICIENT

IN the drying of many different types of clay, sand, and similar materials—in fact, *any* inorganic material which must be handled in large quantities at the lowest cost—the patented Type L Louisville Dryer offers greater economies than have ever before been possible.

Built on an entirely unique and exclusive principle, the advantages of the Type L Dryer are obvious at almost first glance. If you are not familiar with this principle, we earnestly urge you to write for a description. *Address:* Louisville Drying Machinery Co., *Incorporated*, 435 Baxter Avenue, Louisville, Kentucky.

It's News for YOU

Looking for *exceptional* air compressor performance—*exceptional* dependability—*exceptionally* low maintenance cost? Then get the good news about Gardner-Denver "WB" air compressors! Here are two "case histories" out of many in our files—typical of the kind of satisfaction YOU can expect when you install a Gardner-Denver "WB" Compressor.

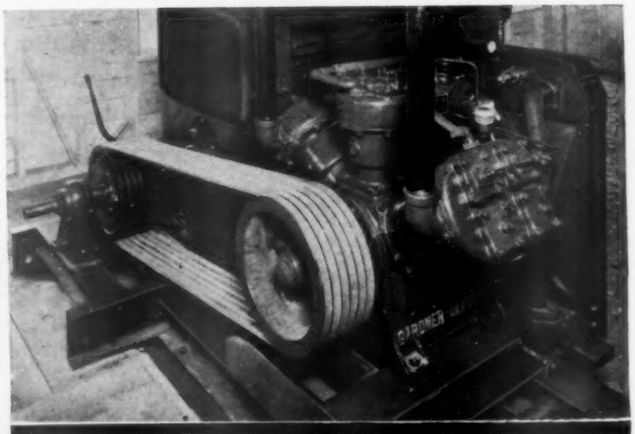
ONLY 20 MINUTES' "TIME OUT" IN 2½ YEARS' OPERATION

In Quebec, a Gardner-Denver WBH Compressor with "Caterpillar" Diesel drive has been in operation for 2½ years—running on an average of two 8-hour shifts a day. Thus far, only 20 minutes' working time has been lost on account of repairs—and the repairs cost $1.20. Fuel and lubricating cost for the 2½ years' period has averaged 55c per hour—or only .625c per horsepower per hour.

ELECTRICAL BILLS DOWN 10% WITH GARDNER-DENVER "WB" COMPRESSOR

After installing a Gardner-Denver WBG Compressor, equipped with duomatic control, an owner writes that his electrical bill has been reduced 10%. Yet the Gardner-Denver Compressor provides much more air than the previous current-wasting compressor.

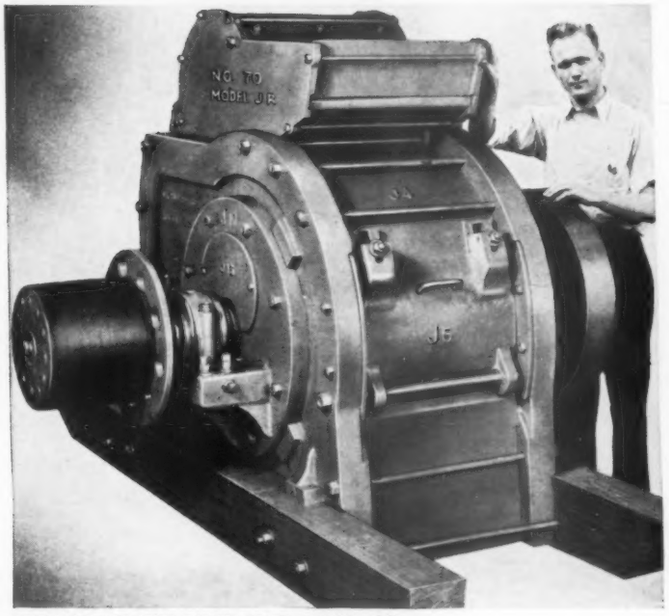
INVESTIGATE—for greater profit on YOUR jobs. Send for our bulletin WB-10 today. Gardner-Denver Company, Quincy, Illinois.



GARDNER-DENVER

80th ANNIVERSARY YEAR

RUGGED BEARINGS HELP THIS PULVERIZER CRUSH 50 TONS OF STONE PER HOUR



BUILT BY BROOKS EQUIPMENT & MFG. CO.

Nothing has been left undone to make SKF Spherical Roller Bearings help this No. 70 Model "JR" Pulverizer crush up to 50 tons of road stone per hour through 2" screen bars. They are protected from moisture and clouds of dust by rugged SKF Pillow Blocks . . . are easy to install, lubricate and inspect.

High capacity enables SKF Bearings to take heavy loads. Their self-alignment permits them to turn with the shaft without binding. Their high-grade steels are hardened throughout for resistance to wear. Consequently, they turn freely year after year at speeds up to 1200 r.p.m., transmitting 100 belt horsepower. If you, too, want the right bearing in the right place, see your SKF representative or write direct. 4401

SKF INDUSTRIES, INC., PHILADELPHIA, PA.

THE BEARINGS ARE

SKF

BALL & ROLLER BEARINGS

Before installing DUST or FLY ASH Collectors

What such companies as those listed here have done it will pay *you* to do. More than 1100 companies today are using Buell's Van Tongeren system for dust collection or fly ash correction. Reorders regularly follow as new needs arise.

Buell Collectors combine the low-cost, trouble-free service of the cyclone with the high over-all efficiency of the patented Van Tongeren design. Investigate, and you will find that Buell Collectors give you the maximum return on your investment.

INVESTIGATE BUELL AND *save money!*

FOR INFORMATION on dust collection ask us for *Bulletin D81;* on fly ash, for *Booklet A93.* Either, or both of these will be sent free to any managing executive or operating engineer.

BUELL ENGINEERING COMPANY INC

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Wherever you are located you will be quickly served through sales offices of either BUELL ENGINEERING CO. or B. F. STURTEVANT CO.

SOME RECENT BUELL INSTALLATIONS

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Reorder 10 months later

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DUST COLLECTORS

SETTLE THE QUESTION OF LOW MATERIAL HANDLING COST . . . WITH A

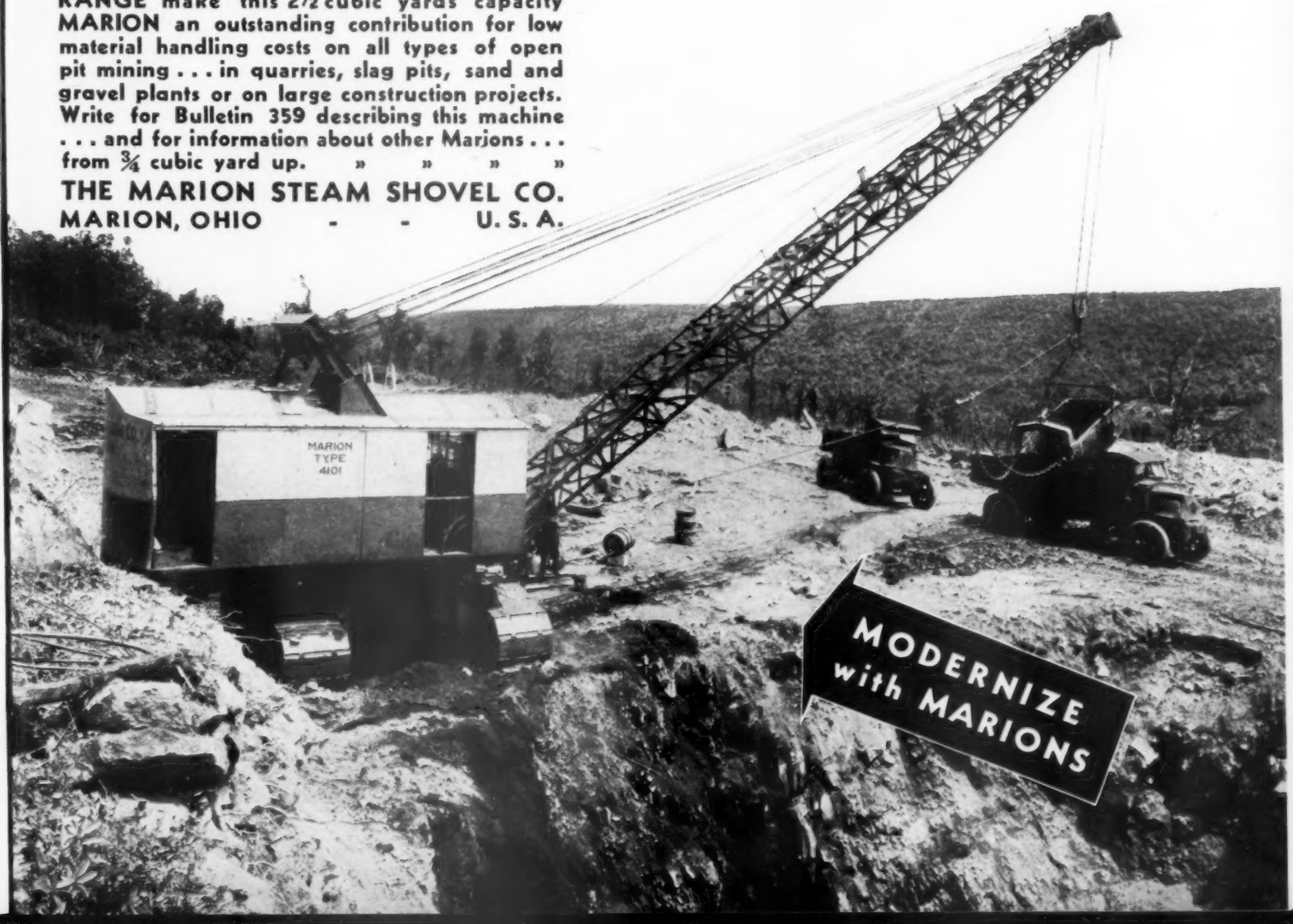
MARION

TYPE 4101

DRAGLINE SHOVEL

SPEED . . . CAPACITY . . . LONG WORKING RANGE make this 2½ cubic yards capacity **MARION** an outstanding contribution for low material handling costs on all types of open pit mining . . . in quarries, slag pits, sand and gravel plants or on large construction projects. Write for Bulletin 359 describing this machine . . . and for information about other Marions . . . from ¾ cubic yard up. » » » »

THE MARION STEAM SHOVEL CO.
MARION, OHIO - - U. S. A.



ROTARY KILN FIRING

now reduced to the most economical form

RAYMOND Bowl Mills provide a unit system of drying, grinding and direct-firing coal to cement and lime kilns that shows major savings in operating-overhead, power costs and fuel consumption.

In the plant above, two Bowl Mills have replaced a complicated bin-system of fueling cement kilns, and they have proved so satisfactory that another unit will soon be installed for a third kiln.

The new system is entirely dustless and automatic, both mills being controlled by one operator from the panel boards located on the burner floor. Thermostatic controls keep the coal-air mixture at the right temperature for efficient combustion.

Other advantages include the following:

Fineness held uniform within a range of 75% to 80% through 200-mesh.

Raw coal dried in mills from average 12% down to 4½% moisture content.

Waste heat taken off at kiln hoods and drawn into mills through ducts.

Hazards of coal dust eliminated by completely enclosed mill system.

Write for Catalog No. 43

The Operator

can control and watch the mill operation from the electric panel board, shown opposite, which includes:

Draft Gauge

Inlet and Exit Air Temperature Recorder

Mill Power Ammeter

Watt Hour Meter

Feeder Revolution Counter

Feed Rate Indicator

Starter Push Buttons with Pilot Lights

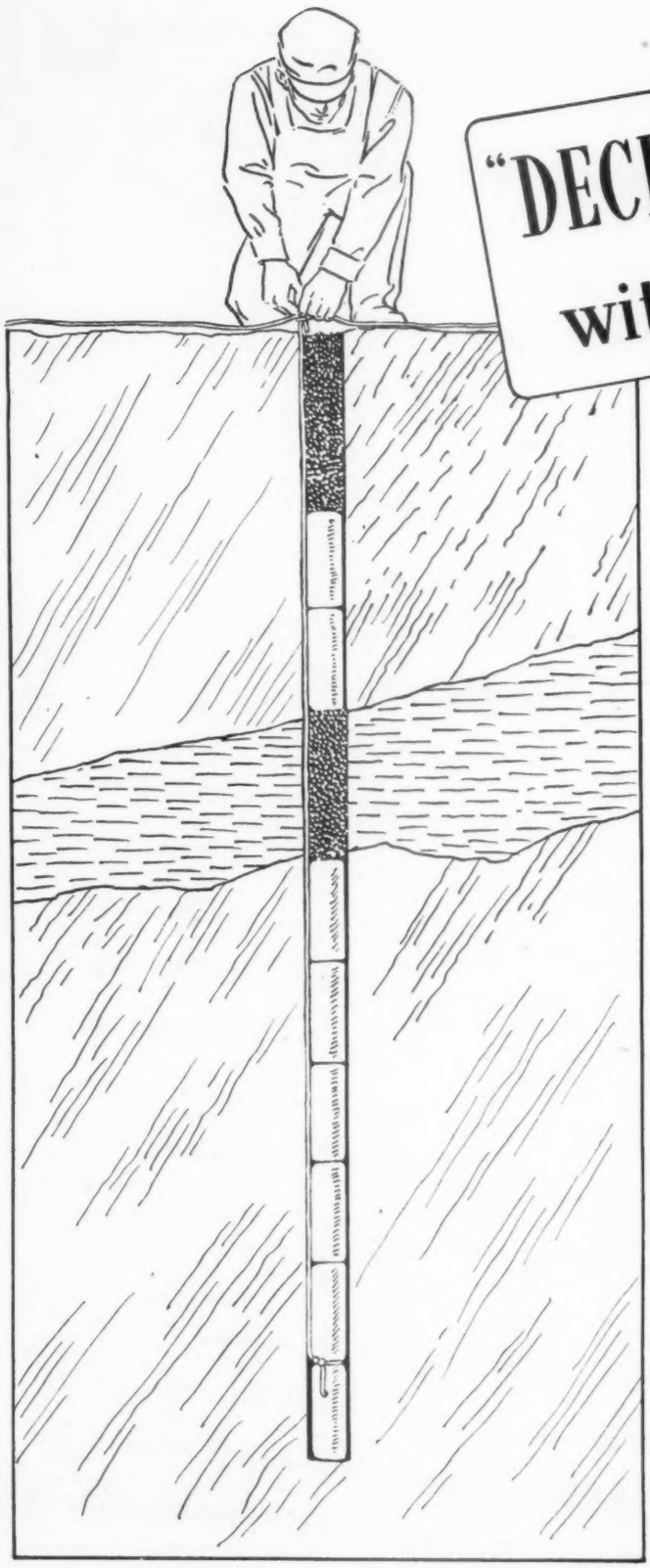
Convenient operating control and thermostatic tempering control—plus smooth, quiet, vibrationless operation of the Bowl Mill—bring new efficiency in rotary kiln firing.

RAYMOND PULVERIZER DIVISION

COMBUSTION ENGINEERING COMPANY, INC.

1321 North Branch Street **CHICAGO**

Sales Offices in Principal Cities • • • In Canada: Combustion Engineering Corporation, Ltd., Montreal



"DECKLOADS" are simpler with PRIMACORD

Detonating the separate charges in a deckload is greatly simplified when Primacord-Bickford Detonating Fuse is used as the detonating agent. The Primacord is fastened to the first cartridge and lowered to the bottom of the hole. Since it will be in contact with *all* cartridges in the hole, whether these are separated from the main charge or not, you are assured that each and every cartridge will "go." And each, being detonated directly by the Primacord, will have the added force of a primer cartridge.

This insensitive detonating fuse consists of a core of PETN contained in a waterproof, flexible textile cover. It is light, strong, easy to use. Write for the Primacord booklet.

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PRIMACORD·BICKFORD *Detonating Fuse*

PB14

You Have a Date at St. Louis

No matter whether you produce sand, gravel, crushed stone, or ready-mixed concrete, you have a date at St. Louis in January . . . a date when your industry's leaders will gather in annual convention at the Jefferson Hotel to exchange views on economic, operating and legislative problems. All producers, irrespective of association membership, are invited to attend, to participate in the proceedings, to see and study the newest in machinery and equipment on display at the exposition held in conjunction with each convention listed at the left. Outstanding authorities on national problems will address you and you will long remember the top-notch entertainment features now being arranged.

Plan definitely to come by making your hotel reservations now! You will be amply repaid by the new knowledge you will acquire, by the valuable new contacts you will make, by the old friendships you will renew.

CONVENTION DATES

●

January 17, 18, 19—1940

Twenty-Fourth Annual Convention, National Sand and Gravel Association.

January 17, 18, 19—1940

Tenth Annual Convention, National Ready-Mixed Concrete Association.

January 22, 23, 24—1940

Twenty-Third Annual Convention, National Crushed Stone Assn.

Fine Sizes Now Made With a
SHORT HEAD CONE

Behind and to the left of the three-foot Short Head can be seen a portion of the three-foot Standard Symons Cone.

Again, the Short Head Cone fills the need for increased demand of finely crushed materials. When the Hopkinsville Stone Company of Hopkinsville, Kentucky, placed its first Cone in service in 1931, a three-foot Standard Crusher met the then existing need for finer sizes. But, as with so many producers, changing conditions required more and more fine material which the earlier installation could not produce economically. The solution to the problem was the installation of a Short Head to follow the Standard, just as many other producers have done under similar conditions.

Producing finer sizes in sufficient quantities when required, and at a cost which will return a greater profit, is the reason why the more progressive companies have turned to the combination of Symons Standard and Short Head Cones. If your demand for fine sizes is increasing, it will pay you to investigate how the Short Head Cone will lower your crushing costs.

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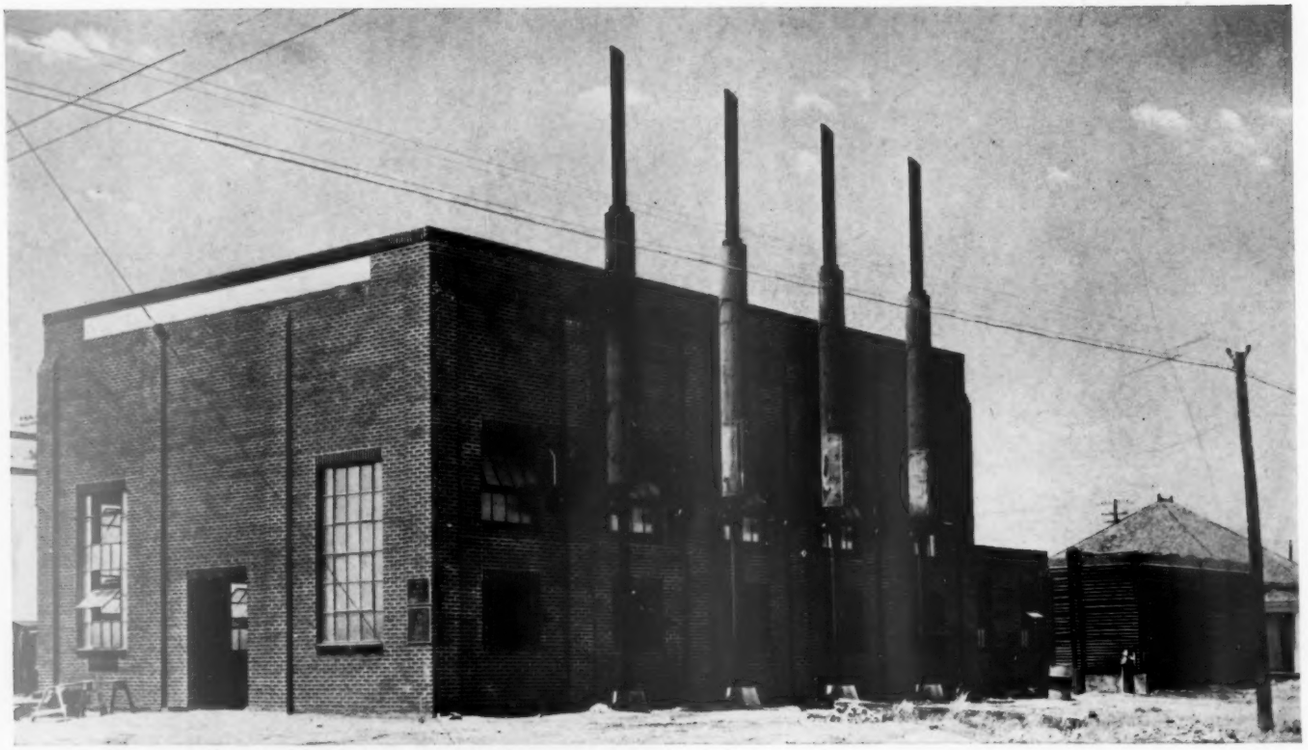
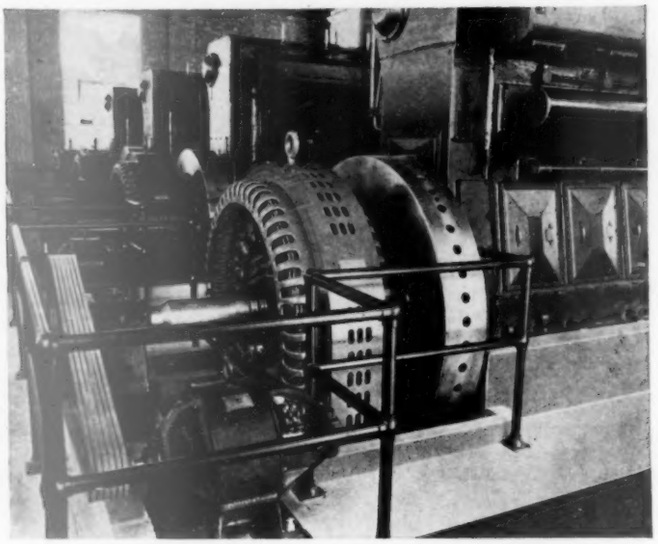
SYMONS CONE CRUSHERS

Somebody Is Saving On Power Wherever You See Diesel Exhaust Stacks!





This plant contains four Superior Diesels —all the same size and type for flexibility and interchangeability of parts.

Somebody has used good judgment in buying when you look inside the plant and find Superior heavy duty Diesels, because these engines are designed for low operating and maintenance cost and years of dependable service.

Find out about these engines if your power costs more than one cent per KWH!

★ ★ ★

THE NATIONAL SUPPLY COMPANY . . . SUPERIOR ENGINE DIVISION

FACTORIES: Springfield, Ohio; Philadelphia, Pa. · SALES OFFICES: Springfield, Ohio; Philadelphia, Pa.; New York, N. Y.; Los Angeles, Calif.; Houston, Texas.

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ROCK PRODUCTS AND QUARRY

Vol. 32 November, 1939 No. 5

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MEMBER AUDIT BUREAU OF CIRCULATIONS

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MATERIAL HANDLING ROBINS EQUIPMENT

ROBINS CONVEYING BELT COMPANY
15 Park Row **New York, N. Y.**

Lose Fight to Halt Work on New Plant

TO APPEAL TO SUPREME COURT

The fight of 290 Los Altos, California, property owners to halt construction of the Permanente Cement Corporation's $4,000,000 cement plant at Los Altos has been lost.

Judge Maxwell McNutt of San Mateo county ruled that the court was without power to halt construction of the plant, and further that it has no power to dictate to any company what devices it shall install to prevent spreading of dust.

L. D. Bohnett, attorney for the property owners, announced an appeal will be taken to the California Supreme Court. The property owners claimed dust and noise from the plant will create a nuisance.

Cement to be manufactured at the $4,000,000 Permanente cement plant, now under top speed construction near Los Altos, California, will be known as "Santa Clara Valley" Portland cement.

Some 1400 workers are now rushing the plant to completion.

Diamond Will Construct New Storage Building

Construction of a new reinforced-concrete clinker-storage building occupying a ground area of 206 by 80 feet is scheduled to get under way shortly at the Middle Branch, Ohio, plant of the Diamond Portland Cement Company.

Truck Carrying Stone Plunges Off Ferry

A truck and trailer carrying ten tons of ground limestone, owned by the Columbia Quarry Company, of St. Louis plunged off the Harrisonville Ferry into the Mississippi River near Renaut, Illinois, recently.

According to reports, when the ferry boat bumped its dock the heavy truck crashed through the gate and fell into 15 feet of water.

A professional diver was called from St. Louis and the truck was raised by derrick. Apparently the equipment was none the worse for its plunge.

P & Q Industries Share Greatly in WPA Work

Private industrial concerns and equipment contractors have received $1,075,811,148 in orders for the purchase of materials and equipment for use on W.P.A. projects to date, a recent announcement from Washington reports.

The pit-and-quarry industries obtained the lion's share of this business . . . exactly $468,610,793 worth! Approximately $100,000,000 went for cement, $140,000,000 for sand, gravel and crushed stone, $50,000,000 for concrete products, $50,000,000 for brick and tile, $90,000,000 for bituminous paving mixtures, and nearly $40,000,000 for unclassified stone and glass products.

Coming Events

January 17-19, 1940—St. Louis, Mo. Annual conventions, National Sand & Gravel Association and National Ready Mixed Concrete Association, Jefferson Hotel.

January 22-24, 1940—St. Louis, Mo. Annual convention, National Crushed Stone Association, Jefferson Hotel.

January 29-February 2, 1940—Chicago, Ill. Annual convention and show, American Road builders Association, International Amphitheatre.

February 12-14, 1940—Washington, D. C. Annual conventions, National Concrete Masonry Association and Cast Stone Institute, Mayflower Hotel.

Captain Slider, 73, River Pioneer, Dies

STARTED DREDGING IN 1895

Captain E. T. Slider, 73, founder and president of E. T. Slider, Inc., of Louisville and New Albany, Indiana and the Tell City Sand & Gravel Company of Tell City, Indiana died Wednesday, October 4, at his Louisville home. He had been ill for some time.

One of the pioneers in the Ohio River dredging industry, having launched his first dredge and fleet of tugboats in 1895, Captain Slider was one of the best known and most highly regarded operators along the river. Associated with him in his enterprises are his sons, Chester C. and Clarence N. Slider, both of Louisville.

Hitzelberger Chosen to Promote Texas Roads

The Portland Cement Association has announced the appointment of W. H. Hitzelberger as district highway manager for Texas, effective October 1. For the present, he will continue to maintain an office in the Republic Bank Building, Dallas.

From 1929 to 1938, Mr. Hitzelberger was vice-president and sales manager of the Reliance Clay Products Company of Dallas and more recently operated his own company engaged in the sale of highway materials and equipment.

E. N. Gustafson, formerly assistant district engineer, has been made district highway engineer, in which capacity he will assist Mr. Hitzelberger in highway promotion and engineering.

C. A. Clark, district engineer for the association in Texas, will continue in charge of activities other than in the highway field.

The Holmes Lime Company, Inc., is moving its hydrating and processing plant from Felton, California, to San Francisco. The new plant will be the largest and most modern of its kind in San Francisco.

Industrial-Sand Assn. Directors Confer

21 ATTEND CHICAGO MEETING

With 21 men present, the mid-year meeting of the board of directors of the National Industrial Sand Association was held in Chicago on October 20. The board considered various legal questions of interest to the industry, such as the status of industrial-sand producers with respect to seasonality under the Fair Labor Standards Act, the possible amendment of the anti-trust laws, health and safety codes, and occupational diseases.

The possible effects on industry of mobilization for war were discussed by executive secretary V. P. Ahearn, and the drafting of a resolution expressing the industry's attitude toward war was approved.

The board decided to suspend action on the seasonality problem pending the outcome of the case of the sand-and-gravel industry which has not yet been closed. A proposal to invite the technical director of the American Foundry Association to sit on the industrial-sand association's Sand Research Committee was approved.

No action was taken on the subject of the time and place of the 1940 convention, but expressed preferences point to White Sulphur Springs, West Virginia, and the first half of June.

The following board members, association officers and guests were present:

V. P. Ahearn (executive secretary), Washington, D. C.; E. M. Ayers, Ayers Mineral Co., Zanesville, O.; E. J. Berger, Michigan Silica Co., Rockwood, Mich.; J. S. Cable, Minnesota Mining & Mfg. Co., Akron, O.; E. M. Durstine, Keene Sand & Clay Co., Columbus, O.; L. M. Hanson, Industrial Silica Co.; Youngstown, O.; C. M. Hardy, Hongland & Hardy, Evansville, Ind.; R. G. Hay (president), Ayers Mineral Co., Zanesville, O.; A. S. Hindman, American Silica Sand Co., Chicago; C. Mathiesen, Whitehead Bros. Co., Albany, N. Y.; P. S. McDougall, Ottawa Silica Co., Ottawa, Ill.; Alford J. Miller, Whitehead Bros. Co., New York; John F. Putnam, National Silica Co., Oregon, Ill.; Stanley A. Phillips, PIT AND QUARRY, Chicago; Nathan C. Rockwood, *Rock Products,* Chicago; Ralph T. Stevens, Cape May Sand Co., Cape May, N. J.; J. M. Strouss, Deckers Creek Sand Co., Morgantown, W. Va.; G. A. Thornton, Ottawa Silica Co., Ottawa, Ill.; Stanton Walker (director of engineering), Washington, D. C.; A. Warsaw, Wedron Silica Co., Chicago; William J. Woods, Pennsylvania Glass Sand Corp., Lewistown, Pa.

EMPLOYMENT AND PAY-ROLLS

(Compiled for PIT AND QUARRY by Isador Lubin, Commissioner of Labor Statistics, U. S. Dept. of Labor.)

Industry	Establishments	Number of Employees	Pay Rolls (1 week)
Cement:			
July, 1939	137	21,707	$579,278
August, 1939	137	21,756	594,396
Percentage change		+0.2	+2.6
Quarrying and non-metallic mining:			
July, 1939	966	36,199	782,325
August, 1939	966	36,680	820,914
Percentage change		+1.3	+4.9

Trucks Move Aggregates to Upper Narrows Dam

Pouring of concrete for the Upper Narrows debris control dam near San Francisco has begun.

A sand-and-gravel plant has been constructed and is in operation on the south side of the river. From this plant to the bins at the dam site, a distance of more than four miles, a fleet of ten 10-cubic yard trucks are hauling sand and gravel night and day. The bins and mixing plant have been installed above the top level of the dam.

The dam will be of the concrete-arch type, with a crest length of about 1153 feet and a height of 265 feet from main foundation bedrock to crest. The spillway will be of the overflow type, discharging over the central portion of the dam.

The $2,175,000 general contract is held by Arundel Corp. and L. E. Dixon Company of Los Angeles.

Recent Equipment Installations * * *

Link-Belt vibrating screens, a Morris centrifugal pump and a Symons cone-crusher are new equipment at the Navarre, Ohio, plant of the Massillon Washed Gravel Company. * * * *A triple-deck Diamond Iron Works screen has been installed by the Glacier Sand & Gravel Company, Minneapolis.* * * * An 85-hp. Caterpillar Diesel engine is now supplying power at the crushed-stone operations of Elizabeth Hempy, Rushsylvania, Ohio.

McLanahan & Stone crushers have recently gone into service at the Douds Stone Quarry Company, Douds, Iowa, and the Clough Sand & Gravel Company, Syracuse, New York, while Neidigh Brothers, Bellefonte, Pennsylvania, have installed two roll-grizzlies and a vibrating screen of McLanahan & Stone manufacture. * * * *The Canoe Creek Stone Plant at Horrell, Pennsylvania, is now operating with a new Kennedy-Van Saun crusher.* * * * Improvements at the plant of the Crystal Lake Crushed Stone Company, Sheboygan, Wisconsin, include a new Telsmith single-deck vibrating screen.

Three Diesel-driven White trucks with 14-ton trailers have replaced locomotives, cars and a tramway at the Crescentdale, Pennsylvania, plant of the Medusa Portland Cement Company. * * * *Lytle Brothers have installed a 9-by 21-inch Telsmith jaw crusher at their sand-and-gravel plant near Cleveland.* * * The Perry Stone Company, Radnor, Ohio, has in-roll-crusher and a Cedar Rapids jaw crusher. stalled two Simplicity screens, a New Holland

Steel Boom Puts Quarry on Seven-Day Schedule

Because of the increased demand for steel as a result of the war and general rearmament throughout the world, the Inland Lime and Stone Company plant at Port Inland, Michigan, has adopted a seven-day per week work schedule, Superintendent A. J. Cayia has announced. Approximately 50 additional employes have been hired as operations are speeded up to meet increased demand. Practically all the output is metallurgical stone used in the mills of the Inland Steel Company.

Must Post Agreement If Exemption Is Claimed

Employers claiming exemption from the maximum hours and overtime provisions of the Fair Labor Standards Act because they have "1,000 hour" or annual wage contracts with certified representatives of their employees, are required, under new regulations issued by Administrator Elmer F. Andrews of the Wage and Hour Division, to keep a copy of the agreement on the premises. In addition, they must file copies of such agreements, and of all subsequent amendments or additions thereto, within thirty days after they are made, with the Administrator at Washington, D. C.

Sues Texas Companies Over Price Uniformity

CHARGE ANTITRUST VIOLATION

The Attorney General of Texas has filed suit against the San Antonio Portland Cement Company, and the Longhorn Portland Cement Company, both of San Antonio, for alleged violation of the anti-trust laws. The suit alleges that the defendant companies have agreed among themselves and with other companies operating in the state to set uniform prices and terms and conditions of sales, thereby restraining free competition.

The suit asks that the charters of the two companies be forfeited, that receivers be appointed to bring to a close the companies' affairs and that penalties be assessed against the two firms.

A Correction

In the article *Changes in Technology and Labor Productivity in the Cement Industry, 1920-1938,* by George Perazich and Theodore Woal, published in the October issue of PIT AND QUARRY, the ordinate in Chart I on page 46 should have been labeled "millions of barrels" insteads of "thousands of barrels."

WPA Competes Less with Private Plants

POLICY OPPOSES SUBSIDIZATION

The W.P.A. Law passed by the last Congress (officially styled the "Emergency Relief Appropriation Act of 1939") represented a vast improvement over past W.P.A. appropriation bills, although not going as far as it should have gone in forbidding subsidized governmental competition with private industry, V. P. Ahearn, executive secretary of the National Sand & Gravel Association points out.

Two features of the 1939 law are worthy of attention. Section 34 provides that "no funds appropriated in this joint resolution, whether administered by the Federal government or by the states or local governmental agencies from funds contributed in whole or in part by the Federal government, shall be used by any Federal, state, or other agency to purchase, establish, relocate, or expand mills, factories, or plants which would manufacture or produce for sale articles, commodities, or products (other than those derived from the first processing of sweet potatoes) in competition with existing industries."

In order to obtain a definite understanding of the construction to be given to this section by the Works Projects Administration, Mr. Ahearn conferred with its General Counsel William E. Linden. The W.P.A. views that section as forbidding the use of Federal funds in the construction or operation of a mill or plant or factory which is to produce goods to be sold in competition with private industry. Therefore, if an application is submitted to the W.P.A. which proposes the use of Federal funds for the construction and operation of an aggregates plant whose products would be sold to private users or other public users, such an application would be rejected by the W.P.A. as being contrary to Section 34.

The W.P.A. does not view Section 34 as forbidding the use of W.P.A. funds by a public agency whose intention is to produce its own sand and gravel for use on a public work which is the subject of the application to the W.P.A. If a city, for instance, should propose to use W.P.A. funds in the construction and operation of a sand and gravel plant whose products are to be used by that city in carrying out a public work like sewers or streets, and not to be sold to other users for another project not approved by the W.P.A., Section 34 would not constitute a barrier. That view of Section 34 is supported by the Comptroller-General of the United States. Thus it is to be seen that while Section 34 reinforces a Federal policy of not competing with private industry in respect to the use of W.P.A. funds, it falls short in some cases of meeting the problem entirely.

On the other hand, it is abundantly clear that the new W.P.A. Law establishes a broad Federal policy of opposition to subsidized competition with private enterprise. Operators can, accordingly, object to local W.P.A. authorities against any use of Federal funds for the construction and operation of a sand and gravel or crushed-stone plant.

Another part of the new W.P.A. Law may offer a more effective weapon for opposing subsidized competition with the industry, Mr. Ahearn says, and refers to Section 1(c) which provides that "the funds appropriated in this section shall not be used for the purchase of any construction equipment or machinery in any case in which such equipment or machinery can be rented at prices determined by the Commissioner to be reasonable, and his determinations, made in conformity with rules and regulations prescribed by him, shall be final and conclusive."

It seems clear that aggregates-production equipment is viewed by the W.P.A. as falling within the terminology "construction equipment or machinery" employed in this section. The Commissioner has not yet issued the rules and regulations called for by this section, however.

Birmingham Slag Wins Watts Bar Dam Award

The Tennessee Valley Authority has awarded the Birmingham Slag Company of Birmingham the contract for concrete aggregates and earth embankment blanket gravel for use at Watts Bar Dam to the value of $693,900.

The material is to be dredged from the Tennessee River and will consist approximately of 270,000 tons of sand, 200,000 tons of coarse gravel, 235,000 tons of medium gravel, and 240,000 tons of fine gravel for concrete purposes, and approximately 54,000 tons of blanket gravel for use on the sides of the earth embankments.

Zonolite Co. Expands Plant in Montana

The new storage bin, with a capacity of 1500 tons, was completed recently at the vermiculite plant of the Zonolite Company at Libby, Montana, and an addition is being erected which will care for another 1000 tons.

John Myers, superintendent, reports that August of this year was the heaviest month for shipments. He said that 63 carloads of vermiculite were shipped from Libby in that period.

NEWS FROM THE PACIFIC COAST

The Santa Cruz Portland Cement Company recently ordered two Lepol kilns which will be installed in its plant at Davenport, California. These kilns have 11-foot 3-inch by 113-foot rotary sections and will each have a capacity of 2,250 barrels daily. To make place for these kilns four of the eighteen old 7-foot by 7½-foot by 125-foot rotary kilns have been removed. Later two more of the old kilns will be removed to make room for a third Lepol kiln. The company announces that it has purchased the licenses for the right to manufacture these kilns from the Polysius Corporation, and that they will be built entirely in this country. They will be oil-fired.

The company has just completed the construction of six new cement-storage silos which, with two star-bins have a total capacity of 140,000 barrels. These are to be used for boat loading and will supplement the four silos now used for this purpose. A small high-silica-cement pack-house is also being built. Four new 15-foot diameter by 53-foot concrete silos will also be built to store and blend raw-material feed for the new kilns.

A total of ten Sly and Norblo dust-collectors will be installed in various departments of the plant, on driers, mills, silos, etc.

* * *

The Superior Portland Cement Company recently completed the installation of a Fuller pumping system for loading bulk cement into boats for shipment at its Diamond plant in Seattle.

* * *

Pacific Coast Aggregates, Inc., has announced its intention to build a new sand-and-gravel plant at Centerville, California, near its present plant at Niles which it will replace. It is reported that this new plant will incorporate the most modern methods and equipment.

* * *

The Basalt Rock Company, Inc., recently put into operation a new and modern ready-mixed-concrete plant at Flosden, near Vallejo, California. This plant, which has a capacity of 700 cubic yards daily, was built primarily to supply concrete for construction work going on at the Mare Island Navy Yard.

* * *

The Pacific Building Material Company, Portland, Oregon, recently installed a new 4-foot by 10-foot Simplicity 4-deck vibrating screen in its sand-and-gravel plant.

CURRENT BUSINESS INDICATORS

By far the most outstanding industrial development since the outbreak of the European war has been the sensational spurt in steel production. The industry was operating around 60 per cent. of capacity in August and early September, but only a month later was pressing toward 90 per cent., actually reaching 90.3 per cent. for the week ending October 21. At this rate the tonnage of steel being produced was higher than any previous peak in the history of the industry. Steel manufacture is an important outlet for several nonmetals and there is no doubt that the demand for fluxing limestone, metallurgical lime, and fluorspar, as well as dolomite and other refractories has been strong. Increased foundry activity likewise has resulted in a sharp demand for molding and blast sand.

The rise in steel output has been accompanied by advances in other industries, although not quite so marked. Automobiles, bituminous coal, petroleum, electric power, textiles, paper, sugar, flour, and meat products in particular have been in active demand.

Especially significant, however, is the fact that consumption has not advanced anywhere near as rapidly as production. In general, most purchases have been made by domestic industries, although this protective buying unquestionably was prompted by disturbed conditions abroad.

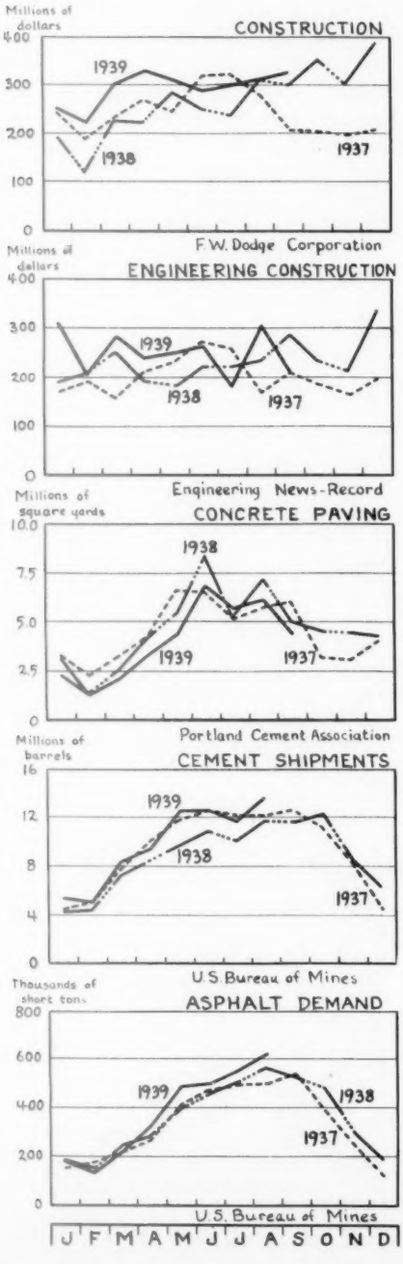
In tracing the source of business since mid-summer one must not lose sight of the fact that the upward trend has been apparent for some time. The general index of the Federal Reserve Board had advanced from 92 in May to 103 in August. This rise was prior to the outbreak of war.

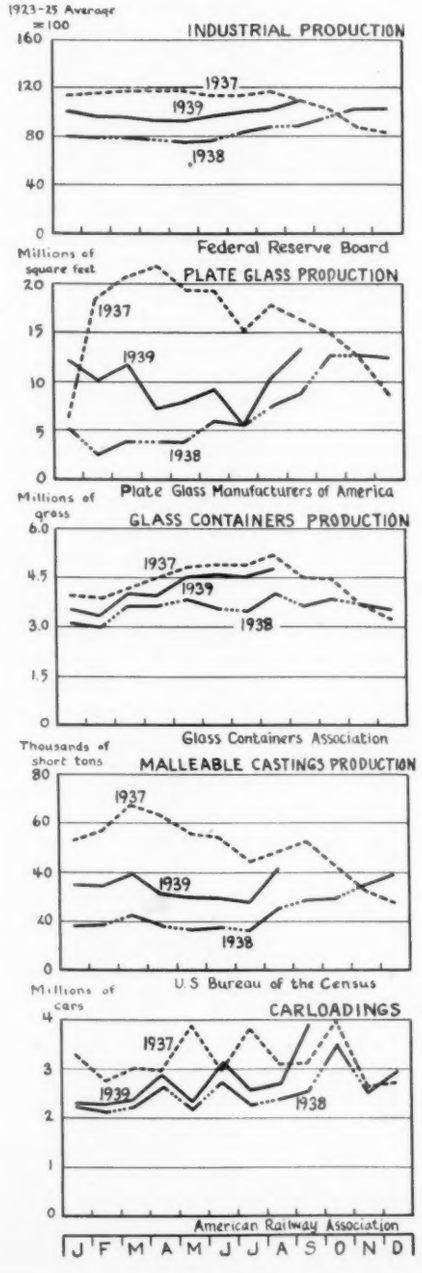
The trend of construction likewise has been upward, although not as spectacular as that of steel and related industries, and contracts awarded in September were somewhat above the average for the summer months despite lower awards financed by public funds. The strength of privately-financed construction is one of the most significant features of the current business advance. Residential contracts in September were as high as in any month during the year, whereas awards for other private construction were the highest in two years and about 25 per cent. greatetr than in September, 1938. Continuation of this relatively high level of private construction will be of great help during the last quarter of the year for there is no public works program in sight such as that which buoyed the construction industry in the closing months of 1938.

Cement shipments rose sharply in August after showing weakness earlier in the summer. Preliminary indications point toward a further increase in September. Total shipments for the first three quarters of 1939 were 18 per cent. higher than the comparable period of 1938. The demand for asphalt remained strong in August. Both engineering construction and concrete paving recovered in August from their sharp declines in July, but dropped again in September.

Plate-glass production reached the highest level of the year in September, paralleling activity in the automobile industry. The output of glass containers reached its seasonal peak in August. Malleable castings production jumped during August and undoubtedly went much higher in September. Car loadings were way up in September, but partly because a 5-week period is represented whereas only 4 weeks constitute each of the previous 2 months.

The big question mark of the general outlook is the European situation. At home the steadiness of privately-financed construction brightens the picture despite the expected reduction in public expenditures for construction during the rest of the year.





Five Indicted After Ready-Mix Dispute

GOVERNMENT LAUNCHES ACTION

For the first time in history, the government on October 12 moved to crush labor jurisdictional strikes by invoking the anti-trust laws, five officials of the Teamsters Union at Washington, District of Columbia, being indicted by a District Court grand jury on a charge of conspiring to tie up public and private construction by strikes, boycotts and violence.

The indictment climaxed weeks of trouble between the Teamsters' and Operating Engineers' Unions over the right to drive ready-mixed-concrete truck-mixers.

Basis of the trouble was the demand of the teamsters for this work which is being performed by the operating engineers. Both are affiliates of the American Federation of Labor.

The indictments represent the first phase of the construction inquiry the Department of Justice is pressing in a number of cities. Grand-jury proceedings are in progress in several localities.

The conspiracy charge is set forth as follows:

"Beginning on or about the 16th day of May, 1939, and continuously thereafter up to and including the date of the finding of this indictment, the defendants, together with divers other persons to the grand jurors unknown and in violation of the act of Congress of July 2, 1890 commonly known as the Sherman Anti-Trust Act, have knowingly, willfully and unlawfully engaged within the District of Columbia in a combination and conspiracy to restrain trade and commerce of, and in, the District of Columbia, to wit: The construction of buildings and other public and private works in the District of Columbia, and the trade and commerce in materials used or to be used in the construction of said buildings and private and public works; and that it was part of said conspiracy that said restraint would be and was effected by employment of strikers, boycotts and by threats to use, and the use of, force and violence."

In carrying out the alleged conspiracy, the indictment said, it was attempted to compel various companies operating the truck-mixers to employ as drivers only members of the Teamsters' Union and to breach contracts previously entered into by the companies with International Union of Operating Engineers. The three companies named are Howat Concrete Company, Maloney Concrete Company and Super Concrete Corporation. They are said to operate more than 50 per cent. of all truck-mixers and were employing, it was added, about 75 per cent. of their operators and drivers from the ranks of the Operating Engineers' Union.

It further sought, the indictment says, to compel the drivers and operators to resign from the Engineers' Union and become members of the Teamsters' Union.

The indictment says further that by "threat of force and by force" the defendants prevented the delivery of concrete by the truck-mixers operated by engineer union members.

"The said conspiracy and each of the acts of said conspirators was not intended to be, nor was it in fact, in aid of higher wages, shorter hours, better working conditions for labor or any other legitimate object of a labor union," the indictment sums up, adding that it had as its "sole object" the replacing of Local 77 (teamster) members by Local 639 (engineer) members on the mixers.

The Joseph Banks Construction Company of Wilke-Barre, Pennsylvania has leased a limestone deposit east of the village of Nesquehoning and plans to erect a crushing plant on the site with a capacity of 50,000 tons annually.

RECENT GOVERNMENT CONTRACTS FOR MATERIALS UNDER THE PUBLIC CONTRACTS (WALSH-HEALY) ACT

Date of Delivery 1939	Source of Supply	Government Agency	Commodity	Amount
Indef.	International Agricultural Corp., Mount Pleasant, Tenn.	T. V. A.	Phosphate sand, brown rock; lump rock phosphate	$122,010.00
Indef.	Hoover & Mason Phosphate Co., Mt. Pleasant, Tenn.	T. V. A.	Brown rock phosphate sand	201,250.00
12/31	The Solvay Process Co., Jamesville, N. Y.	Agriculture	Agricultural limestone	Indefinite
12/31	Munnsville Limestone Corp., Munnsville, N.Y.	Agriculture	Ground limestone	Indefinite
12/31	Farber White Limestone Co., McAfee, N. J.	Agriculture	Ground limestone	Indefinite
12/31	L. & M. Stone Co., Utica, N. Y.	Agriculture	Agricultural limestone	Indefinite
12/31	Racex Lime & Fuel Corp., Catskill, N. Y.	Agriculture	Pulverized limestone	Indefinite
12/31	D. U. Smith & Bros., Ashley Falls, Mass.	Agriculture	Agricultural limestone	Indefinite
12/31	Michigan Limestone & Chemical Co., Buffalo, N. Y.	Agriculture	Agricultural limestone	Indefinite
12/31	Hoosac Valley Lime Co., Inc., Adams, Mass.	Agriculture	Ground limestone	Indefinite
11/29	New York Trap Rock Corp., Clinton Point, N. Y.	W. P. A.	Broken stone	14,910.00
11/30	Jahncke Service Inc., New Orleans, La.	W. P. A.	Sand and gravel	28,840.00
10/1	Bituminous Materials Co., Inc., Terre Haute, Ind.	W. P. A.	Bituminous coated aggregate	27,166.00
Indef.	Superior Portland Cement Inc., Seattle, Wash.	Procurement	Portland cement	Indefinite
11/30	Peter Judlin, Inc., New Orleans, La.	W. P. A.	Portland cement	15,640.00
10/5	California Portland Cement Co., Colton, Cal.	Interior	Cement	70,000.00
10/6	Monolith Portland Cement Co., Monolith, Cal.	Interior	Cement	107,200.00
10/6	Southwestern Portland Cement Co., Victorville, Cal.	Interior	Cement	44,550.00
12/30	Elk River Concrete Products Co., Helena, Mont.	Interior	Concrete pipe	13,841.20
Indef.	Capitol Concrete Products, Inc., Scotia, N. Y.	W. P. A.	Concrete pipe	106,920.00
12/31	Lee Lime Corp., Lee, Mass.	Agriculture	Pulverized limestone	Indefinite
6/30/40	Dermot Shemwell & Sons, Armena, Ga.	Agriculture	Ground agricultural limestone	Indefinite
6/30/40	Dolcito Quarry Co., Birmingham, Ala.	Agriculture	Dolomite limestone	Indefinite
6/30/40	The Calhoun Lime Co., Cameron, S. C.	Agriculture	Agricultural limestone	Indefinite
6/30/40	Campbell Limestone Co. ,Gaffney, S. C.	Agriculture	Agricultural limestone	Indefinite
11/30	Lee Lime Corp., Lee, Mass.	Agriculture	Pulverized limestone	Indefinite
11/30	Amsden Co., Amsden, Vt.	Agriculture	Ground limestone	Indefinite
6/30/40	S. W. Downer, Glassboro, N. J.	Navy	Foundry sands	13,644.00
2/12/40	California Portland Cement Co., Los Angeles, Cal.	War, Engineer	Portland cement	21,300.00
Indef.	Pacific Portland Cement Co., San Francisco, Cal.	W. P. A.	Portland cement	72,500.00
Indef.	Monolith Portland Cement Co., Los Angeles, Cal.	W. P. A.	Portland cement	73,500.00
Indef.	Yosemite Portland Cement Corp., San Francisco, Cal.	W. P. A.	Portland cement	75,000.00
9/28	Universal Atlas Cement Co., Buffington, Ind.	W. P. A.	Portland cement	10,325.00
10/31	Alpha Portland Cement Co., Martins Creek, Pa. Allentown Portland Cement Co., Allentown, Pa. Glens Falls Portland Cement Co., Glens Falls, N. Y. Hercules Cement Corp., Hercules, Pa.	W. P. A.	Portland cement	15,952.50

Builds Concrete-Pipe Plant in Portland

The Oregon Culvert & Pipe Company of Portland, recently built a new concrete-pipe plant at 2650 N. E. 82nd Street in that city. A Tuerck-Mackenzie pipe machine and other equipment has been installed.

Honor Waldron Sprague After 47 Years Service

Waldron H. Sprague, of Northport, Massachusetts, who was retired August 23 after 47 years of service with the Universal Atlas Cement Co. of Boston, was given a testimonial dinner September 13, at the Augusta House, Northport, by the dealers and contractors with whom he has been associated in Maine. Sixty business men from all over Maine, New Hampshire and Massachusetts attended the banquet to pay tribute to Mr. Sprague and presented him with a new automobile.

Mr. Sprague's nephew, Herbert D. Sprague, has been associated with his uncle for the past year and will assume the position left vacant.

Cement Specifications

To the Editor:

On page 49 of the September 1939 issue of PIT AND QUARRY is a paper by Dr. Gabriel Ashkenazi that treats quite frankly of certain things, that have been sources of controversy between cement makers and users, and of other matters that have been common knowledge to cement-plant chemists and those familiar with the chemistry of cement manufacture, none of which have had the open discussion that they should have had. It may be inferred from his paper that there is a great deal that we do not know about cement, and that no one is in the position to say that cement will have certain properties just because it has a certain chemical composition.

Cement-plant chemists and operators have known this for a long time. They have not dared to speak out and say what they really think because this is now, and has been for several years, a buyers' market. If a buyer purchases on a freak specification and a certain plant or group of plants can produce cement meeting that specification, it is, or they are, pretty apt to produce it, with the idea of increasing their tonnage, and the question as to whether the proposed cement is the best is not raised. In fact, the producer is apt not to be asked for his opinion at all.

Take, for instance, the matter of the allowable percentage of alumina, Al_2O_3, or tri-calcium aluminate, C_3A, in the cement. We are led to believe that it is only recently that it has been learned that these compounds, in amounts over a certain somewhat poorly, but arbitrarily, defined percentage, do the cement no good and may be harmful, but is that true? On the contrary, it was known in the early years of the century, and perhaps even before that, that a high-silica cement, or at least one in which the ratio of silica to alumina is high, is easier to manufacture and to control in its physical properties than one of which that is not true. About the only difference in thought is that then alumina was believed to exist in cement clinker mostly as di-calcium aluminate, C_2A, while now it is considered to be present largely as tri-calcium aluminate, C_3A, after all the iron oxide present has been combined with alumina and lime to form the compound that is abbreviated C_4AF.

Yet how many hundreds of thousands or, more correctly, millions of barrels of cement that would be considered high-alumina has been used, and even considered the standard American cement? Has the concrete made with this cement all failed, or any substantial part of it? Not noticeably. On the contrary, such cements have helped to make much of the concrete that has been such an important construction material in the last thirty years or so, and that concrete is in good condition. There is no substitute for time as a prover of all things, including concrete.

The relative values of low- and high-alumina cements were discovered more or less fortuitously. When the cement industry overflowed into the Middle West the source of silica and alumina was in many instances glacial clay, in which the ratio of silica to alumina is rather high. Cement made with such clay as one of the raw materials was found to be quite easy to produce and to have greater latitude in manufacture than was by experience found to be possible with the older cements. Such cements have been and are now being used in large quantities, and their superiority was found to be so apparent that now some manufacturers whose local raw materials are deficient in silica are adding it to the raw material as sand or in any other form that will give the same chemical and physical results.

Such cements are easy to make and easy to sell, but it does not follow that they are the only good cements. Such a generalization is hardly in order when one considers the many structures built with high-alumina cement that are sound both functionally and in appearance and are giving the service for which they were designed.

Some specifications do not limit the alumina, Al_2O_3, but do limit the calculated percentage of tri-calcium aluminate, C_3A. One way to reduce the latter is to add iron oxide to the raw material. It is not a volatile substance, and passes through the process into the clinker, where it forms tetra-calcium alumino-ferrite, C_4AF, using some of the alumina and lime in so doing. The alumina so used does not appear among the calculated compounds as C_3A.

C_4AF has not been shown to have any marked hydraulic power. In other words, it is of no value as a cement or as an ingredient of cement. It is then a diluent, adding no value to the cement in which it is found. Yet cement makers are forbidden to grind an added diluent with their cement. That is called adulteration.

Research work of a very high order is being done on the constitution of Portland cement. The field is a difficult one, and the work has called for the development of new methods and apparatus. But research has not shown us all there is to be known about cement, and no claim to that effect has been made by those who are doing the work. As one result of research, cement may in time become what we may call a synthetic product, in that every ingredient will be weighed separately into the raw mills. There is a slight tendency in that direction now as regards certain ingredients. In general, however, a manufacturer finds it to his interest to do the best he can with the raw materials that Nature has placed on his own property, and which he can excavate in quantity and, therefore, cheaply. As long as that condition obtains cement will not be an absolutely uniform commodity, but if properly made it will always be good enough for the uses to which it is put.

Research work on concrete, as distinguished from clinker and cement, is also actively in progress. Time is a very essential element in such work, and exposure to natural commercial conditions is better than to the standardized procedure of the laboratory. No entirely satisfactory method of shortening this time has been devised, or of reproducing the conditions of actual service other than the service itself.

Of course there have been failures of concrete. Quite commonly it is said in such cases that the cement is at fault, and this in spite of the fact that the cement is almost certain to have conformed to the specifications of the American Society for Testing Materials. Those who made the cement know better, but are in no position to say anything, and it is left to men like Dr. Ashkenazi to speak out.

We have had, and now have, too many specification writers and specifications. It is even proposed to come into a cement mill and tell the operator how he must run it. And special cements usually must be stored in special silos and held for 28-day testing, which ties up the manufacturer's storage capacity. This adds to the cost of making the cement because of the carrying charges on the silo and on the cement itself.

The customer has a right to ask that the cement he buys have certain physical properties, because on these properties depends the value of the cement. He has no right to specify a certain chemical composition and then say that cement having that composition must have certain physical properties. The two may be inconsistent, and in any event the chemical composition is the business of the manufacturer only, so long as his product meets reasonable requirements, and the specifications issued by the American Society for Testing Materials are suitable for the vast majority of cases, and in the writer's opinion, for all.

To show how Dr. Ashkenazi has anticipated what is said above, and to

repeat a very clear statement of the attitude the cement maker should assume, the last few sentences of his paper are quoted:

"The most favorable composition ultimately depends on the nature of the raw materials and the manufacturing conditions only. Specifications leading to vigorous regulation as to the compounds composition of cement are handicapping the normal course of manufacture. In order to avoid a misunderstanding, however, the writer wishes to say that it is necessary, and absolutely within the rights of customers, to specify the general properties of cement, such as the resistance, setting time, heat of hydration, soundness, shrinkage, etc. Requirements connected with the chemical composition, especially those limiting the proportions of 'computed compounds,' are inadmissible. The producer will himself determine the right way and the suitable mixture in order to make a product having the required properties."

That is a very clean-cut statement of what specifications should and should not cover.

CEMENT ENGINEER

Revised Standard for Aggregates Published

The Division of Simplified Practice of the National Bureau of Standards has announced that printed copies of the first revision of Simplified Practice Recommendation R163, Coarse Aggregates (Crushed Stone, Gravel, and Slag), are now available. This revision, covering sizes of coarse aggregates and their uses, is identified as R163-39.

As originally promulgated in 1936, the recommendation carried two groups of sizes with the same overall range, but with different intermediate size ranges. The Joint Technical Committee of the mineral aggregates associations, in submitting that plan, recognized the disadvantage of having two groups, but pointed out that when wide acceptance of the recommended sizes had been obtained, an effort could be made to consolidate the two groups. As a result of experience gained since 1936 the standing committee, in the present revision, achieved the desired consolidation of sizes into one group, and thus effected a net elimination of 12 sizes. The revision, like the original, comprises primary sizes and their combinations or modifications, but closer tolerances have been fixed for the lower limits of each size. One size was added to meet a growing demand for fine seal construction for surface treatment of airports and for other surfaces requiring a fine seal material.

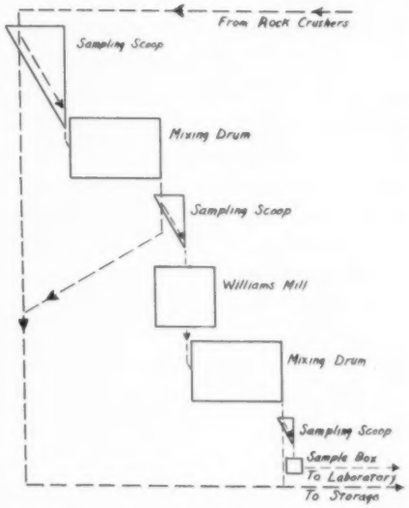
Copies may be obtained from the Superintendent of Documents, Washington, D. C., for 5 cents each.

Ore-Sampling Methods

By JAMES ANDREWS
Plant Engineer
Union Portland Cement Company

The installation of special equipment for sampling limestone and shale at the Union Portland Cement Company's plant at Devils Slide, Utah, has proved to be entirely satisfactory. This plant uses the dry process and the raw mixture is proportioned before going to the rock driers. There is no provision for making any correction after the rock once enters the process and limited storage capacity necessitates very accurate control of the raw mix at all times in order that the kilns will receive a feed of uniform composition. This was difficult to accomplish by hand sampling methods. Since equipment similar to that used for ore sampling was installed no trouble has been experienced in raw-mixture control.

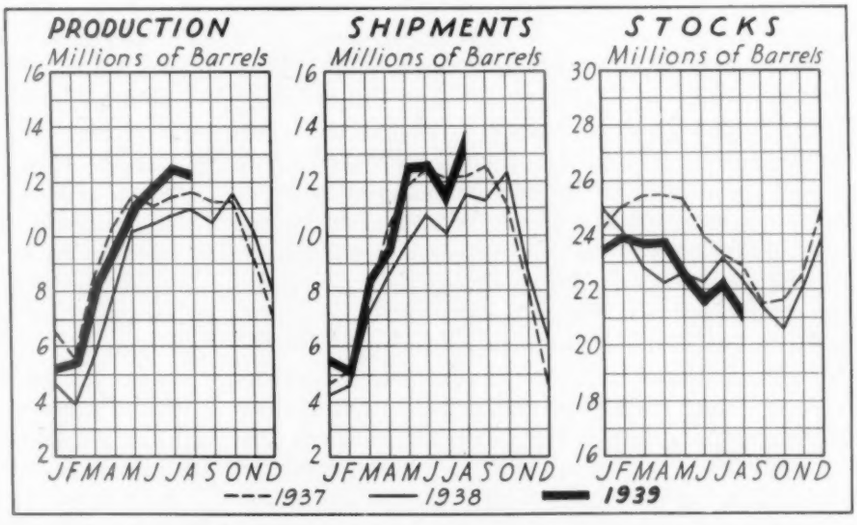
The sampling is done after the rock leaves the crushers and before it enters the rock-storage bins. A rotary scoop dips into the main stream of crushed rock as it leaves the crushers. The size and speed of rotation of this scoop are such that about one-tenth of the main stream is removed for sampling purposes. The material from this scoop is discharged into a continuous-mixing drum, where the composition of each scoopful of rock becomes blended with that just previously taken. A second smaller rotary scoop removes a portion of the discharge from the first mixing drum and delivers it to a small Williams hammer-mill which reduces the maximum particle size of the discharge to about ¼ inch in diameter. The product of the hammer-mill enters a second mixing drum, whose discharge is again sampled by a third and still smaller rotary scoop. The portion of each stream not taken by the scoop is returned to the main rock stream. The quantity of material discharged by the third scoop amounts to about 1 cubic foot for each 150 tons of rock crushed.



Mr. Andrews' flow-sheet sketch of the rock-sampling method.

This quantity is small enough that it may be quartered further by hand and then sent to the laboratory for analysis.

This method reduces to the minimum the amount of labor required for accurate sampling and also eliminates any errors which might be caused by human failure. While an investment is required for the installation of such equipment and it must be kept in repair at all times, it has solved a troublesome problem in this plant. The results obtained have warranted its use.



The Portland-cement industry in August, 1939, produced 12,369,000 barrels, shipped 13,804,000 barrels from the mills, and had in stock at the end of the month 20,926,000 barrels, according to the Bureau of Mines. Production and shipments in August, 1939, showed increases of 12.4 and 16.8 per cent., respectively, as compared with August, 1938. Cement stocks at mills were 7.1 per cent. lower than a year ago.

EDITORIAL

Let's Stay Level-Headed

SO FAR we have not seen any evidence of an organized effort to engulf the United States in the conflict that has fallen on the peoples of Europe. Many attitudes—most of them probably free from selfish impulses—have been, and will continue to be, construed by those of different views as attemps to undermine the intention of many Americans to remain at least physically neutral. Yet these have not yet reached proportions, nor have they disclosed that uniformity of underlying principle, which can be said to mark them as indisputably the result of planned and persistent influence. As a nation we still appear to be unwilling to throw our strength into a struggle, whose causes, motives and ultimate effects are not known even to the participants in it.

Nevertheless it would be unwise to assume that, because such an organized effort is nowhere visible, it does not exist. It is reasonable to expect that those who could profit by our entrance into the war will make every effort to achieve that end, and that those who might suffer from it will naturally and with no less vigor try to prevent it. The evidence of both types of effort is rather clearly visible in news dispatches, despite the desire of editors to limit them to statements of fact. Where those who try to maintain a sense of balance are no better informed, and usually less well informed, than those who regularly distort the truth, there is not much likelihood of developing an intelligent, fact-grounded public opinion. In theory our newspapers are free to express their opinions, free to present or withhold facts, free to adopt policies that they believe to be favorable to their own or their readers' interests. In reality it is impossible to formulate publicly-useful policies, to develop sound opinions, to present the facts, when the facts can not be ascertained, when truth is inaccessible, when, as in the present war, the opposing governments deem it prudent to disguise their objectives, conceal the facts, and color with the hues of humanitarianism and offended righteousness the official statements they release. What should be our most useful sources of information are now, in the face of impending dangerous changes in public opinion, powerless to help.

Some small satisfaction may be derived from the fact that the groups seeking to affect our judgments are opposed to each other and that, as a result, their conflicting propaganda efforts have a tendency to cancel out. They may, and to an extent do, neutralize each other, but the resulting state of mind is not one of clear, well-defined opinion but of confusion and helpless indecision. Men with sincere desires to think and act fairly, with no thought of judging harshly or unjustly, find themselves unable to acquire the foundational knowledge so essential to the forming of intelligent opinions, and there follows a kind of intellectual despair. In his futile search for facts, in the swaying of his judgment, first this way and then that, the average man falls into mental chaos, a state in which the desire for truth, repeatedly frustrated and remaining long unsatisfied, is easily and quickly transformed into a desire for action, action of any kind, action that will break the pall of uncertainty, confusion, and indecision that hangs over him. That is a state to be feared, for it is certain to lead to the making of dangerous and irretrievable decisions, the physical and psychic costs of which can not be calculated.

When in moods of wishful thinking, we are confident in our belief that we will not become involved in a struggle that, despite evidences of half-heartedness on the part of some of its participants, holds the threat of immeasurable loss to them and to those who must now and in the future live and deal with them. At other times we fear the effects of some sudden change of view on the part of the mass of Americans, whose sanity in this hour keeps them from approving involvement. An event of relatively little importance but of great emotional content may in the twinkling of an eye upset our present sense of proportion unless we can, through the processes of reason alone, develop a stability of thought, a determination of purpose, that will make large-scale emotional reactions impossible.

IN these days wars are not the results of spontaneous emotional outbursts on the part of whole peoples. Wars are the products of statesmanship, of political opportunism, and when the ends it seeks coincide with the interests of humanity it is more often in the nature of accident than of planning. Statesmanship is a craft, and statesmen are job-holders, who strive continuously to maintain themselves in their positions, to better themselves socially and economically, to create the appearance (and too often the reality) of activity in justification of their ambitions and claims. Having at their command the emotions, services, fortunes and lives of those who tolerate them, they have great power to shape the destinies of men, a power which they seldom hesitate to use if the ends, judged by their own self-seeking standards, appear to justify the means.

Realization of this truth leaves in us all a feeling of compassion for those who, because of the time and place of their birth, fall the victims of a political chicanery that knows no ideals and stands for no ideologies except its own aggrandizement and perpetuation. Yet, most peoples get the kind of government,

the kind of leadership, they deserve; if they do not protest against its iniquities, if they do not throw off its tyrannies, they must be held to approve them, they must be held accountable for their bad effects. Even in a situation where the press is government-controlled, where the avenues of information are clogged or muddied by the intrusion of propaganda, a nation can not be entirely free from responsibility for the actions of its government. It is the irony of the situation in many nations to-day that those who probably know the least about their government's policies and aims may ultimately pay most dearly for the follies that result.

Happily for this country, the power to declare war still resides in the Congress and the Congress is still not unmindful of its dependence on the approval of the public. Safety lies in numbers, and the task of convincing more than a hundred million people of the inevitability or justness of a proposed war is certainly far greater than that of winning the consent of a monarch, a dictator or a coterie of politicians. The chance for unwise or precipitate action is small. But the Congress is our Congress, the government of the Unted States must still look to the American people for its authority and support, and it is the responsibility of Americans to determine what burdens they will assume.

WE think that it can still truthfully be said that the majority of Americans hold the view that there is not, and is not likely to be, any necessity for the United States becoming involved in the present European conflict. Not many Americans seem to feel that their natural sympathies for relatives living in foreign countries, for peoples of like cultural backgrounds, for small nations oppressed by larger ones, or for any of the various ideologies that are said to motivate the different contenders in the struggle, should be allowed to influence their judgment to remain free from entanglement in the web of international world politics. The sanity displayed by most persons with whom one talks promises much for the continued neutrality of their government.

We see no striking similarities between the present period and the corresponding period of the World War. That war, because of its extent and duration, left physical and psychic results that are not yet gone or forgotten and which were not present before America's entry into it. These results exert a tremendous influence in favor of neutrality, an influence that is augmented by the comparative freedom of Americans from government-inspired propaganda and the freedom, still unimpaired in this country, to speak, write and assemble without other restraints than those imposed by each individual's sense of dignity, honesty and personal responsiblity.

The high cost of living of the last war has not been forgotten by those millions of Americans who, despite its large money wages and an orgy of reckless spending, continue to pay the money cost of that struggle in the form of unemployment, dissipated savings, or greatly restricted earning power. The anguish of thousands of families, in which death, shattered minds and maimed bodies attested their sacrifices for a cause that has since been stripped of its cloak of righteous aims, lives on as a check to unrestrained emotional upheavals that favor military action. For such people war has lost any glamour it may once have had.

Opposition to war on religious and ethical grounds has progressed rapidly in the years that have passed, as has also that based on rational grounds. Even in England, where conscientious objectors were badly treated during the last war and where emotions are now greatly aroused, no fewer than two per cent. of those conscripted for the present war have voiced their determined opposition to war on grounds that have nothing to do with personal sympathies.

American business men, who, in common with those of other countries, are supposed, because of its profit-making possibilities, to be inclined to favor a new war, look upon such a conflict with fears that were not present to deter any similar inclination before the last war. Apart from any moral opposition to war, any hunger business men may have for the profits that come from war is being effectively checked by horror of what a war may cost them. Staggering taxation on corporate and individual incomes; the conscription of capital; the regulation of profits, prices, wages, hours, production, markets; an inevitable strengthening of the working and consuming portions of the populations; the granting of new and greater powers to government and the unlikelihood of these ever being wholly relinquished—in short, the possible socialization of the national economy and the resultant extinction of business except in its smallest phases—are sufficiently realistic fears to prevent any widespread acclaim of war on the part of business men.

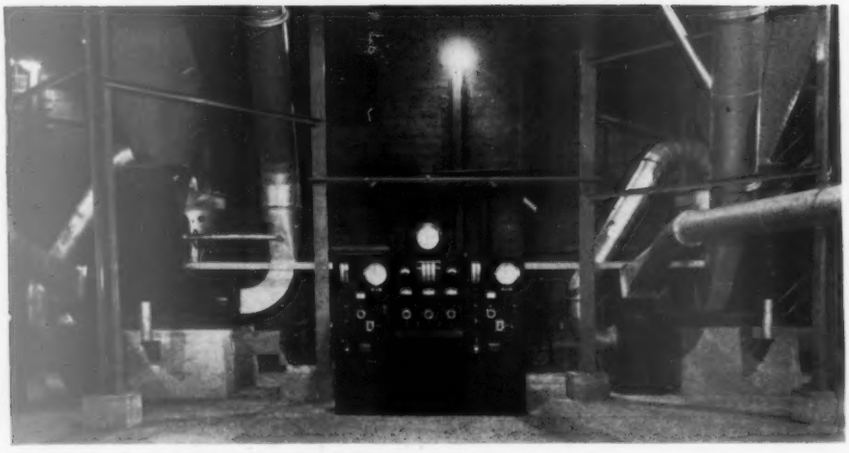
WE see, therefore, an array and a combination of factors favoring peace that were not present before the World War, and we do not feel that we are naïvely hopeful when we say that they should act as powerful deterrents. Foreign-born organizations will continue to flourish among alien groups of our people, but their results will not be great as long as they are tolerated; such movements thrive under opposition and oppression. Political groups bent on changing our political and economic systems will not grow in power if the conditions which give them materal for organizing discontent are corrected. Labor groups can not be converted into organized *saboteurs* led by antisocial fanatics, if the principles of freedom and equality so dear to Americans are applied to the field of industrial relations as they have been to the field of political relations.

Meanwhile freedom of discussion, toleration of different opinions, and respect for intelligent criticism are the surest guarantees of level-headed thinking.

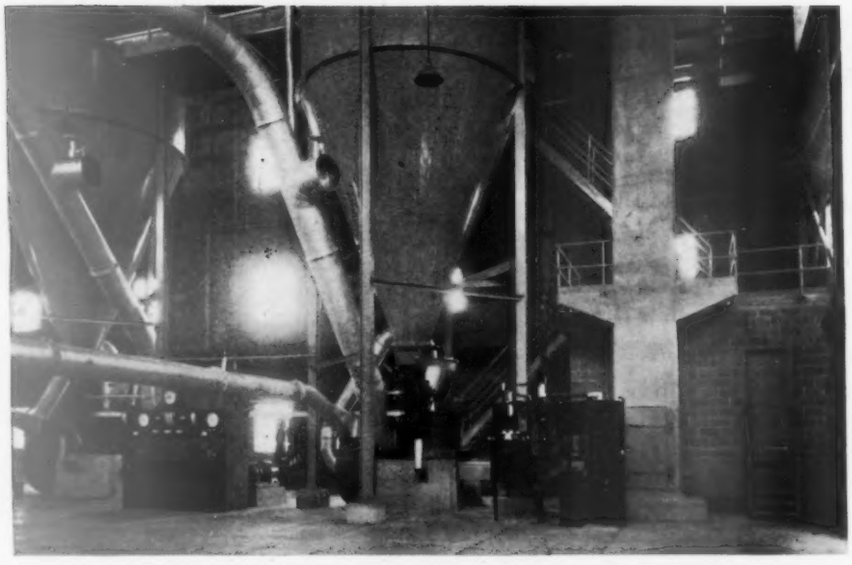
The stacks at Limedale.

By HARRY F. UTLEY

Lone Star Installs Direct-Firing Coal Mills at Limedale



The two bowl-type direct-firing coal mills with control board between them.



Another view of the mills with 350-ton feed bins above. At the right is the concrete-inclosed bucket-elevator which carries the coal up to the distributing screw-conveyor.

DIRECT-FIRING kiln installations have been made in a number of plants operated by the Lone Star Cement Corporation in recent years. In every instance the new method has come up to expectations in economy, improved efficiency and in various other ways. The latest unit in the Lone Star chain to adopt this modern means of fuel preparation and burning is the wet-process plant at Limedale, Indiana, where two direct-firing bowl mills and appurtenances were installed during April and May of this year to serve three 10-foot by 240-foot rotary kilns. These direct-firing pulverizers went into service in June and while definite operating figures are as yet unavailable, the units have apparently greatly reduced coal consumption, and power requirements have been cut to the minimum. In addition, they have eliminated the previous hazard of explosion due to coal dust.

Formerly a large and rather complicated coal-drying and grinding department served the kilns, requiring considerable operating labor, and the up-keep cost ran high. Under the old system hopper-type railway cars discharged the coal into the storage bins, an overhead crane transferred it to the hopper of an elevator which lifted it to a single-roll crusher. After crushing, another elevator carried the fuel to another bin structure, from which it was chuted to two rotary driers, thence by elevator to two tube-mills for pulverizing. The powdered coal was then driven through pipe-lines by two pumps to three 35-ton conical steel storage bins on the burning floor to be ready for fueling the kilns.

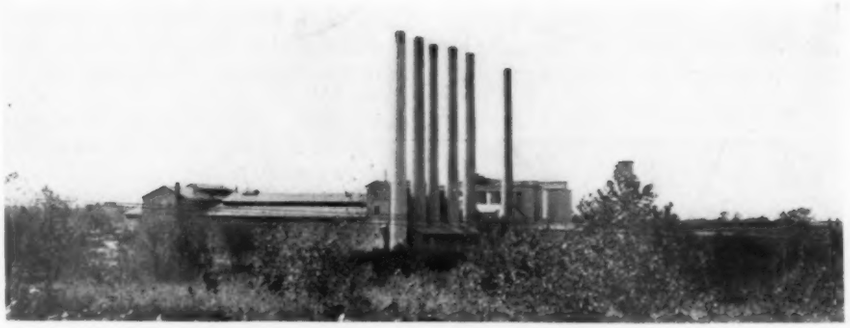
Under the new direct-firing system, entirely automatic and controlled by

push-button from the burner floor, hopper-type cars bring in the coal and discharge it into a new concrete track hopper in the center of the coal-storage bins. Beneath the hopper a 24-inch apron-feeder of the horizontal type feeds the coal, which requires no crushing, because it ranges in size from slack to ¾ inches, to a 24-inch belt-conveyor operating on 90-foot centers in a concrete tunnel.

Ordinarily the coal goes direct from the cars via the track hopper to the apron feeder in this manner, the surplus overflowing into the storage, which has a capacity of about 3,000 tons. Should the track hopper be empty, however, or in the event it is inconvenient to move a carload of coal into position, two auxiliary feeders, automatic in operation, can draw coal from storage to keep a constant stream of fuel moving toward the kilns. These ingenious feeders, designed by the company and built in the Limedale shops, are located over the tunnel belt-conveyor immediately ahead of and behind the apron-feeder. A roller, mounted on a pivoted, counter-balanced arm, controls the feed. Should the coal layer on the belt thin out, these rollers, which ride on the coal moving along the belt, are lowered accordingly and actuate gates, admitting more fuel to the belt. When the normal supply is resumed, the rollers rise as the coal stream on the belt thickens, cutting off the supply from the bins.

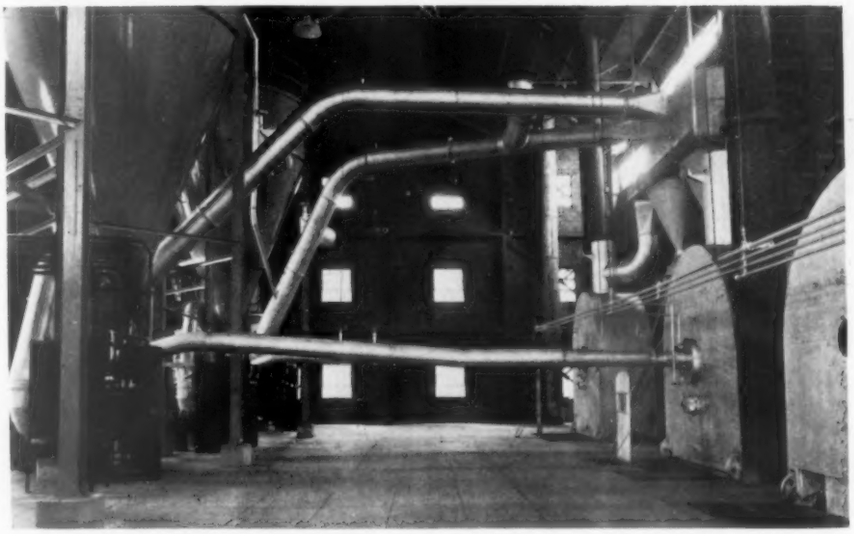
A magnetic pulley at the head end of the tunnel conveyor removes tramp iron as the coal is transferred to a second and longer 24-inch belt-conveyor. This belt, operating on an incline and at right angles to the tunnel conveyor, is 118½ feet long between centers and carries the fuel to the kiln floor, discharging to the boot of a new concrete-inclosed bucket-elevator. Carried upward about 40 feet, the coal is dropped into a 16-inch screw-conveyor which extends horizontally over the 35-ton conical bins which feed the two bowl mills. A manually-controlled gate apportions the fuel about equally to the two bins. A single Bindicator on the 35-ton bin which supplies the second mill thus controls both bin levels and automatically shuts off the supply of coal to the belt at the apron feeder, when the bins are nearly full. All elevating and conveying equipment is interlocked electrically so that in case of failure at any point in the system the equipment behind is automatically stopped until the trouble can be cleared up.

In the mills the bowl or grinding chamber revolves around the rolls which remain in a fixed position as they rotate on their journals. Grinding pressure is maintained by compression springs, sufficient clearance always existing between the bowl and the rolls, the grinding surfaces never coming in contact with each other, but only with the coal itself. Any tramp iron or steel scale from the coal cars which

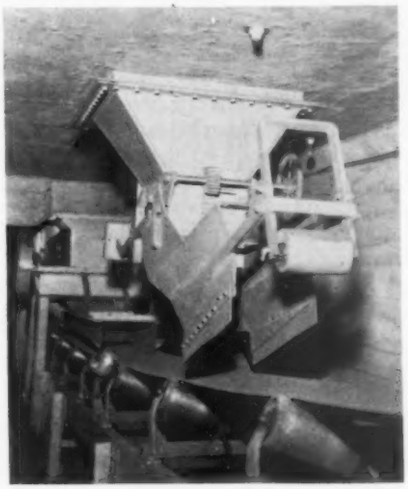


General view of the Limedale plant as seen from the quarry.

The crusher building at the quarry.

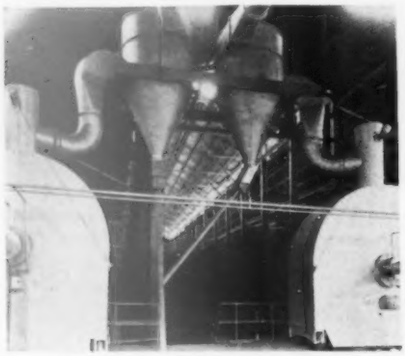


View on burning floor showing new coal mills at left, kiln-hoods at right and hot-air ducts and feed pipes. The ducts have been encased in insulating material since this picture was taken.



One of the two company-built auxiliary coal feeders in the tunnel conveyor. Apron feeder in background.

may have passed the magnetic pulley previously mentioned as well as nodules of iron pyrites are rejected automatically by the coal mills.



Two of the dust traps. Another is being installed on a third kiln.

Waste heat is taken off at the tops of the kiln hoods and drawn into the grinding chambers through ducts. Automatic tempering tees in the hot-air ducts control the temperature of the air to the mills. Cold-air dampers are also located at the kiln hoods, these being manually controlled. Thermostatic controls keep the coal blown from the mills at a constant temperature.

The coal, which comes from the Indiana fields a short distance away, has an average of 12 per cent. of free and combined moisture. This is reduced to about 4½ per cent., mostly combined, in the bowl mills. The coal is of about 11,500 B.t.u. rating and is pulverized to a fineness of 70 to 75 per cent. through 200-mesh by the mills. In this particular case, the coal used is of such a type that it is not necessary to grind finer to obtain complete combustion and good burning. Each mill is driven by a 100-horsepower, 2,300-volt motor.

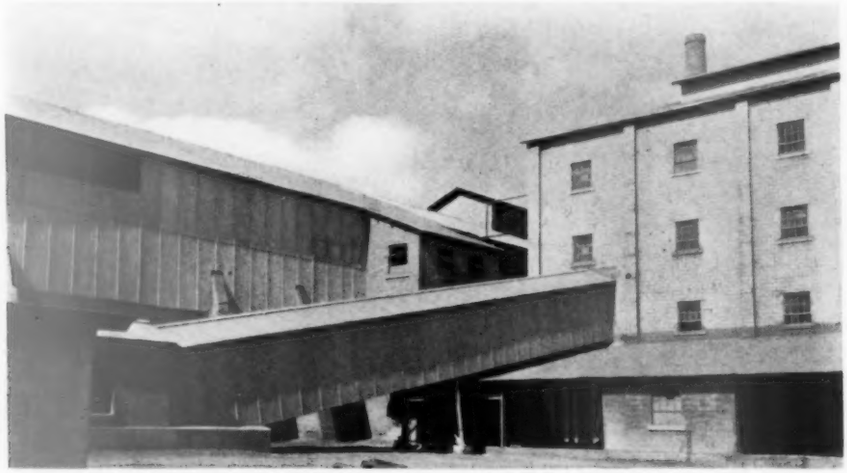
The three 35-ton bins which formerly fed pulverized coal to the kiln burners are still in place, two of them serving the new bowl mills and the third ready to supply another which is to be installed at some future date, the foundation being already in place.

Through the month of October the Limedale plant was closed because of plentiful stocks of finished cement on hand. During this time the finishing touches were put in on the new direct-firing system. As operated through the summer of 1939, the two coal mills were inflexibly connected to two kilns only. In October the third kiln was tied in to allow operation of any two kilns in the group. Hot-air ducts were being encased in insulating material and an additional dust trap added at

Looking down the inclined coal conveyor toward the tunnel-conveyor transfer.

the third kiln. The inclined coal conveyor and coal storage were inclosed with corrugated asbestos sheeting during the shut-down. The return side of the inclined belt-conveyor was being equipped with revolving brushes to wipe off any moist coal which might cling to the belt.

The plant at Limedale was erected in 1918 by the late Adam L. Beck as a one-kiln operation and was later enlarged by adding two more kilns. In 1926 the plant was purchased by the International Cement Corporation, now the Lone Star Cement Corporation, and completely remodeled. By 1930 five



Storage building and coal conveyor recently inclosed with corrugated asbestos siding.

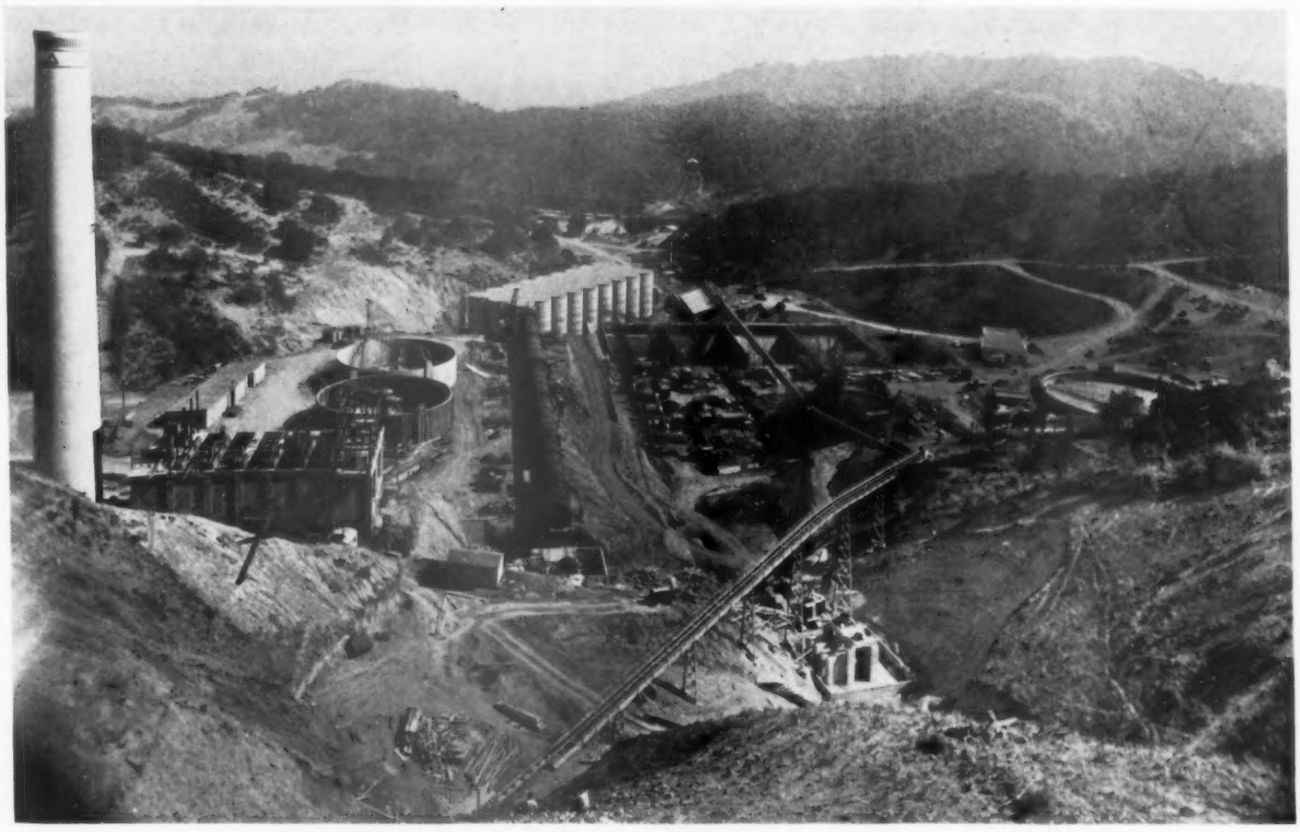
View inside the building where coal, rock, gypsum and clinker are held in storage.

kilns were in operation. Several years ago one of these was dismantled and shipped to South America, where it was installed in one of Lone Star's subsidiary mills. The fourth kiln still remains at the Limedale plant for stand-by service.

The quarry and crushing plant are located about ½ mile from the plant and the stone is brought in by steam locomotive and cars. Raw-grinding is accomplished by five ball-mills and four tube-mills in closed circuit with vibrating screens, taking care of the fifth mill. Preliminary mills and air-swept tube-mills with air-separators do the finish grinding. The packing and storage buildings are located across the concrete road which passes the plant.

A view of the packing and cement-storage buildings.

NEW CEMENT PLANT READY BY DECEMBER



General view of new cement plant of the Permanente Corporation under construction near Los Altos, California.

WITH the smoothness and efficiency which have broken one record after another on some of the largest construction projects ever attempted, the Permanente Corporation is well on its way to establishing a record in the construction of its new cement plant near Los Altos, California. It is now expected that one of the two long kilns will be in operation by December 1 and actual cement production will begin December 15, less than six months after construction was begun. As deliveries of cement are not scheduled to begin until March 1, 1940, this should leave ample time to get operations tuned to "peak" efficiency.

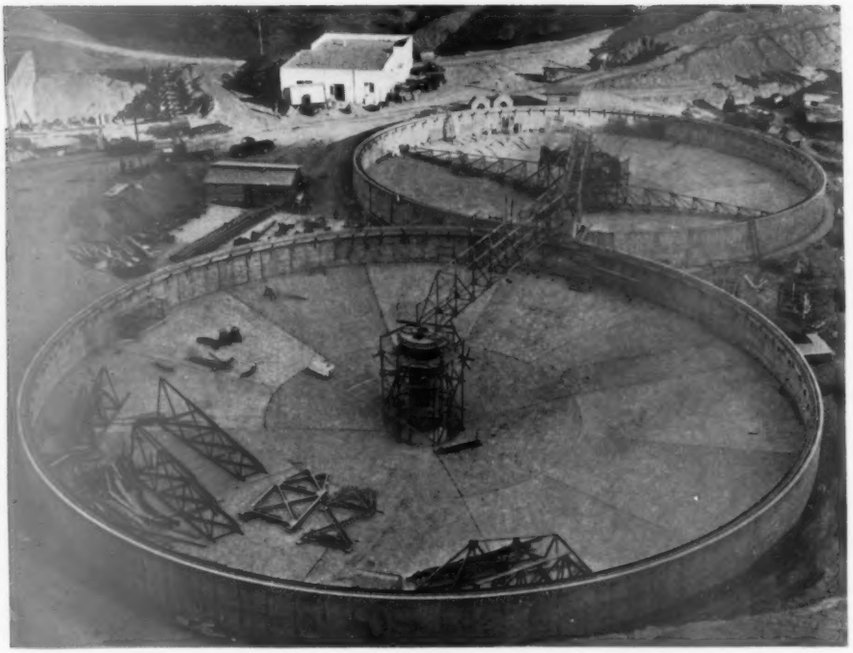
The 6,200-foot main conveyor system from the quarry is now in operation and the raw-material grinding department is scheduled to start November 15. The grinding mills are now in place, all the concrete work for the thickeners has been completed, the slurry-blending tanks and the clinker storage are near completion, and the storage silos and kiln stack have been finished. The laboratory was one of the first departments to be completed. The temporary plant and construction office now in use will be replaced by a modern building in keeping with its surroundings. A 2-mile siding from the Southern Pacific Railroad was one of the first things made ready. Electric and gas connections have been established and an ample supply of water will soon be available. Lining of the first kiln has already begun.

This new plant was designed for a daily capacity of 7,000 barrels of low-heat cement for the Shasta Dam. During the next three years it will produce 5,800,000 barrels of cement under a contract awarded by the Bureau of Reclamation on June 10. In order to utilize all the raw material other products are also to be made. A lime plant with an 8-foot by 125-foot rotary kiln is under construction and this will be in operation in November. Only lump lime will be produced. Other by-products will include crushed stone and rock for sugar refineries, materials which are already in production. It is also tentatively planned to market sand from the flotation plant.

The limestone deposit is situated at an elevation of about 1,700 feet and is in the Santa Clara limestone formation. Its existence has been known for many years but it was never before thoroughly investigated. Extensive diamond drilling and surface exploration indicate the availability of at least 30,000,000 tons of limestone suitable for cement manufacture. The deposit consists of fractured and friable rock which is expected to break up readily in quarrying with less than 30 per cent. over 2 inches in size. This rock averages about 85 per cent. calcium carbonate and the larger pieces run up to 98 per cent. Clay, which is the other raw material, overlies the limestone.

A Bucyrus-Erie 120-B Shovel with a 6-cubic yard Esco dipper puts the stone on a pendulum belt-conveyor serving a crusher which reduces all the rock to a 5-inch maximum size. The three-section belt-conveyor system has a drop of 900 feet in its 6,200-foot length and discharges to a storage-pile with a capacity of 600,000 cubic yards. A screen at the end of this conveyor removes the 2-inch to 5-inch sugar rock. The feed for the lime plant will also be diverted at this point.

Rock will be recovered from storage by means of a tunnel belt-conveyor which will feed the raw-mill department. The Breerwood flotation process, controlled by the Separation Process Company, will be used in the preparation of the raw materials. This process involves the use of froth flotation cells, turbo-mixers, hydro-separators and two huge thickener tanks in addition to the usual slurry mixing, blending and stor-



The 150-foot thickener tanks. Laboratory building in background.

age tanks. The clinker will be stored in a covered building of 350,000-barrel capacity from which it will be reclaimed through a tunnel conveyor to the finish-grinding department. Finished cement will be pumped to the 27 storage silos, each of which is 30 feet in diameter and 100 feet high, the combined capacity being 500,000 barrels. This unusually large capacity is necessary to meet the heavy "peak" demand which will come when concrete pouring at the dam gets under way.

The general design of the plant was prepared by the company's staff, which is also supervising its construction. The Separation Process Company designed the raw-material preparation department. F. L. Smidth & Company are supplying a 462-foot kiln with a Unax cooler and the Traylor Engineering & Manufacturing Company one 450 feet long with a 50-foot cooler. Both concerns are furnishing the appurtenant raw- and finish-grinding mills and other equipment. The Rust Engineering Company erected the silos and the kiln stack. A Western Precipitation Corporation Cottrell electrical precipitator will control kiln-dust loss, and dust-collectors at other vital points will keep the plant virtually dustless.

Gravel Industry Backs Efforts Aimed at Keeping Out of War

THE possible effects of industrial mobilization under war conditions was the first subject of active discussion at the mid-year meeting of the board of directors of the National Sand and Gravel Association held in Washington on September 29 and 30. Executive Secretary V. P. Ahearn presented a summary of results likely to follow the possible entry of the United States into the present European struggle. After consideration of the problem the following resolution, prepared by a committee appointed for the purpose, was unanimously adopted:

"Resolved, by the Board of Directors of the National Sand and Gravel Association, assembled in meeting at Washington, D. C., on this the 29th day of September, 1939, that in keeping with the sentiments of industry as a whole in the United States, the sand and gravel industry endorses the efforts of our government to preserve peace and to avoid our involvement in war; and be it further

"Resolved, that the National Sand and Gravel Association, acting for the sand-and-gravel industry, is prepared to coöperate with all agencies of government and with other organizations of industry in promoting and protecting our national policy of neutrality."

Mr. Ahearn then discussed the recent announcement of the Committee for Industrial Organization that it intended to organize all the building industries and to establish organizations competitive with local building-trades councils of the American Federation of Labor. Apparently the A.F.L. plans to meet the threat of C.I.O. organizing efforts with use of the boycott. In two cities this method is being employed, although the employer has, under Federal statutes and companion state statutes, no alternative but to confer with duly authorized representatives of his workers. The fact that an employer may not interfere with his employees' free selection of union affiliation, even though he is aware that their membership in a C.I.O. union will bring on a boycotting of his operations, is not expected to alter the attitude of the A.F.L.

E. J. Harding, managing director of the Associated General Contractors, then spoke to the board on the details of the recent agreement to eliminate jurisdictional disputes within the A.F.L. which has been executed by the contractors' organization and the federation.

President J. Rutledge Hill of the sand and gravel association then appointed a committee to study the labor situation in the industry preparatory to reporting its findings and recommendations to the association's convention in St. Louis next January. The committee's members are: Alexander Foster, Jr. (chairman), Paul P. Bird, Charles M. Cadman, Otto A. Conrades, Anderson Dana, J. Rutledge Hill, Robert E. O'Connor, John Prince, George W. Renwick and Ray V. Warren.

Stanton Walker, the association's director of engineering, reviewed the cooperative work done with the college of Engineering of the University of Maryland and then discussed the opportunities for research through the establishment of fellowships at the university. He made a progress report on the engineering activities of the association, discussing current investigations of chert, the adhesion of bitumen to aggregates, abrasion and soundness tests of aggregates, and the simplified practice program for sizes of coarse aggregates. The last subject was discussed further at a special evening meeting devoted to it.

The desirability of holding convention machinery exhibits biennially rather than annually was discussed, Mr. Ahearn reporting that at the mid-year board meeting of the National Ready-Mixed Concrete Association in June the four ready-mixed-concrete machinery manufacturers' representatives present expressed a preference for a show each year. As the board of directors of the National Crushed Stone Association had taken similar action, the gravel association's board agreed to adopt the same policy.

Other subjects discussed by Mr. Ahearn were the effect of the Social Security Act upon marine sand-and-gravel workers and the interpretation

(*Continued on page 47*)

Performance Measurement and Mechanical Control-IV

By ROBERT W. ROTHROCK, Ph.D.

THERMOCHEMICAL equilibrium studies presented in earlier articles of this series have shown that, given the proper raw materials and suitable equipment for converting certain of nature's raw materials into new forms —such as Portland cement, lime and gypsum products—the degree to which the new forms will possess desired qualities inherent only because of the conversion, is governed largely by the effective application of heat and the maintenance of a suitable kiln atmosphere. The quality of the product, then, is still contingent upon the ability of the kiln operator to maintain the correct conditions.

In rotary-kiln practice his general method of determining the correctness long has been to make frequent observations of effects that indicate conditions. Among these the color of hot kiln liners, the color of the products in the burning or hot zone and of the smoke issuing from the stack serve as guides. Based upon experience, he will adjust the fuel and air ratio, the kiln feed, the kiln speed and other variables, so as to maintain satisfactory conditions as he "sees" them. Undoubtedly there are many cases where combustion efficiency is quite low and the rejection of the product is relatively high, even though the kiln operation may seem to be giving comparatively good results.

Some manufacturers, however, have successfully applied measuring devices to supplement operator experience. It seems logical to present now some of the ways and means available and in use for guiding operators in the control of burning or furnacing procedures, not only for producing finished products possessing the necessary properties but to produce them through methods that effect a more certain guarantee of profit through economy in operation.

There are instruments available for making a wide variety of interesting and special measurements for conditioning and treating products throughout the Portland-cement manufacturing processes as a whole. However, we should perhaps first be interested in studying some of the more useful measurements and adjustments concerned with the rotary kiln proper, since calcination in the rotary kiln is the principle method of manufacture of Portland cement. The measurements which supply concise information for control are most advantageously applied to the two ends of the kiln. Among these, kiln pressure or draft and temperature are most essential. Other important steps include the measurement and adjustment of fuel feed, raw-product feed, kiln speed, and flue-gas analysis.

How Draft Is Created.—Draft is the movement of air and hot gases through the kiln. Although it may be induced by means of suitable fans and other equipment, draft is ordinarily induced —when fuel burns—by the rise of the hot gases of combustion passing up the smoke stack. Stack temperature or flue-gas temperature must be higher than that of the air outside the stack in order to have draft.

When fuel burns the reaction is one in which the carbon contained in the fuel unites or reacts with oxygen in definite proportions. Air contains oxygen. Draft draws air into the kiln to supply oxygen necessary for fuel to burn. In turn the movement of the hot gases formed by the burning of the fuel creates draft.

Air contains approximately 80 per cent. gases, such as nitrogen, which do not combine in any useful way with fuel. Yet, to secure 1 cubic foot of oxygen for burning fuel, 4 cubic feet of the inert gases must be drawn into the kiln. They must, as well, be heated to the temperature of the flue gases. The heat absorbed by them constitutes, theoretically at least, a loss, since it is released to the outside air upon leaving the stack. From an economy viewpoint the amount of air drawn into the kiln should be the least required to insure complete combustion, the degree of which can be determined by chemical analysis of the flue gases.

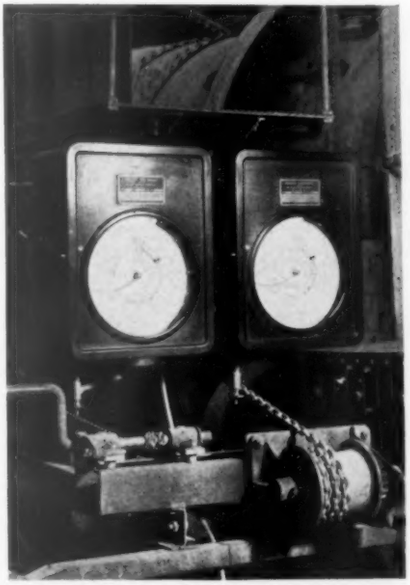


Figure 1. Continuously recorded hood and feed-end draft serving as a guide to the kiln operator in a large cement plant.

The relative movement of air and gases through the kiln may be measured by means of an ordinary U-tube gage. The two legs are filled partially with water as an indicating liquid. When the opening of one leg is inserted, for example, into a smoke stack the difference which occurs in the level of the water in the two legs is a measure of the amount of draft in inches of water.

This method is sufficiently accurate for control, though such control is somewhat haphazard in that the measurements represent the conditions only periodically. More useful information is secured by means of devices which measure continuously and keep either an indicated or recorded measurement visible to the kiln operator at all times.

Draft Control.—It is clear that the control of the draft in any type of kiln or furnace may be considered as a problem of maintaining equilibrium; that is, keeping opposing forces balanced. In this case it involves an accurate regulation and control of the rate of flow of the outgoing gases in such a manner that that rate will be equivalent to their rate of formation. Control is brought about by manipulation of the smoke-stack damper, check draft or the uptake damper of the waste-heat boilers when these form a part of the calcination system.

Although the amount of secondary air entering the kiln through space between the kiln shell and the kiln hood can hardly be exactly determined, the primary air supplied directly to the burner can be measured. The total hood draft, too, can be measured and recorded. In each individual operation there is a definite relationship between the metered air, the hood draft, the feed or stack-end draft and the fuel entering

the burner. The relationship which should be maintained must be determined experimentally. Once the proper ratio is established, it usually is not too difficult to maintain it as standard practice with the aid of fuel- and air-flow measuring devices.

Practical Kiln-Pressure Measurement.—Illustrating one type of equipment designed for the measurement and control of hood draft and feed-end draft, Figure 1 (Bailey Meter Company) shows kiln-pressure recorders applied to a large rotary cement kiln.

In a number of installations the variables, particularly regulation of the

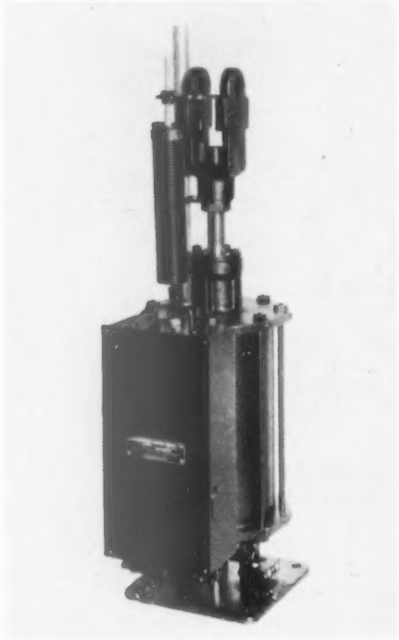


Figure 2. A mechanical device which adjusts itself by changes in kiln pressure to move the stack damper and regulate the flow of gases through a rotary kiln.

stack damper, are automatically controlled by such devices as that shown in Figure 2 (Bailey Meter Company).

In one operation the fuel feed is maintained at a constant rate and kiln pressure adjusted to provide a definite air flow determined by accurate measurement of hood and stack draft. This method of guidance has insured a balanced kiln condition and provided the correct amount of air for economical combustion. Peak flame temperature can be attained in the hot zone and at the same time excessively high stack temperatures are avoided. This represents a positive saving in fuel and, along with this saving, a superior quality of clinker is delivered uniformly from the kiln.

The draft or pressure conditions maintained in this kiln are clearly shown on the chart in Figure 3 (Bailey Meter Company). The record, while it may not appear exceptional to the casual observer of automatic control, is really indicative of very sensitive adjustment, since the discharge end of the rotary cooler is open to the atmosphere outside the protection of any building. This arrangement increases the difficulty of holding conditions constant because of the greater disrupting effect of atmospheric pressure and wind-direction changes. That such changes do cause variation is apparent from the zig-zag curve at times during the day and night when greatest atmospheric pressure changes are known to occur. Even so, notice the uniformity of this record. Draft was held quite close to minus 0.70 inch of water throughout the three shifts of the 24-hour period.

Aside from maintaining conditions optimum for producing a definite quality of product, there are a number of economic values such as the facts that kiln liners last longer, maximum efficiency in combustion is developed relative to the temperature conditions necessary, breakdown interruptions are fewer, continuity in production is prolonged because certain changes in pressure, detected by instruments, serve as a fore warning of ring formation.

Heat Distribution and Gas Velocity.—Still another value of measurement to control draft arises from the fact that to regulate draft is to regulate the flow of gases. Velocity can be regulated to the extent that extreme temperature conditions may be avoided in the stack and, with sufficient fuel being burned, adjusting the draft to decrease the velocity of gases through the kiln will allow combustion to more nearly complete itself within the kiln and result in the maximum heat transfer to the raw materials as they pass progressively through the gradient of temperature zones of the kiln.

Indicate Ring Formation.—High temperatures are necessary in Portland-cement manufacture to bring about fusion. In most cement plants fluxing and stabilizing materials are added to the raw mix to lower the reaction temperatures required. As a result, fusible minerals systems are set up between the kiln liners and the constituents of the

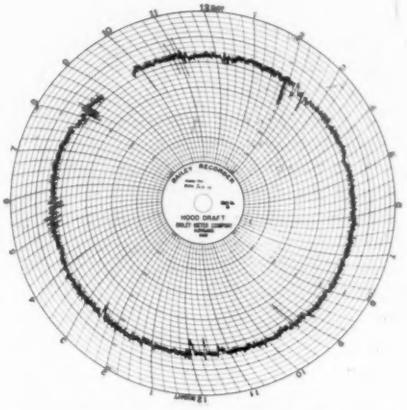


Figure 3. A continuous record of cement-kiln hood draft measured and recorded by devices shown in Figure 1.

clinker. The clinker tends to bond and form a glaze over the kiln-liner surface. A certain thickness of glaze is essential to the life of the liners. However, there is always a tendency, at just about the location where secondary combustion begins to occur, for this fluxing action to build up and form a ring inside the kiln. As the ring builds up more and more, it cuts down production and causes difficulties in kiln operation. An early indication of ring formation in the hot zone occurs when the building up of a heavier than usual coating on the kiln walls is accompanied by a gradual lowering of temperature of the gases as they leave the kiln. At first the firing may be adjusted to raise and hold the temperature where it should be for normal operation. Eventually, as it be-

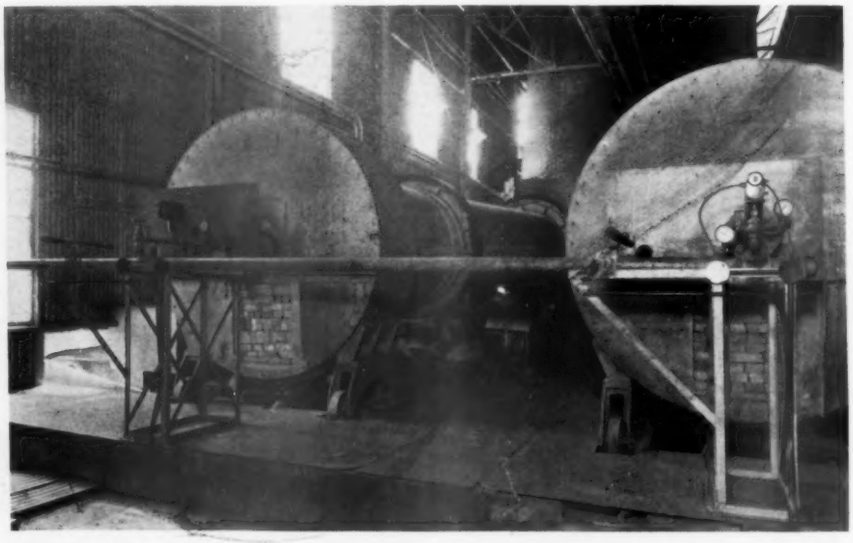


Figure 4. Radiation-type pyrometer arranged to continuously measure hot-zone temperature and record it as a guide to the kiln operator.

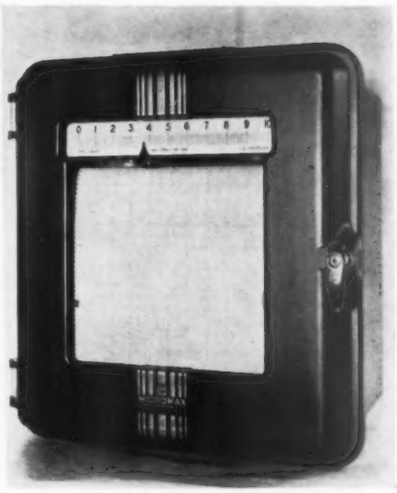


Figure 5. Potentiometric recorder designed to produce a continuous record of hot-zone temperature in the kiln.

comes more and more difficult to hold, hot-zone temperature and flue-gas temperature too become irregular, the ring must be removed in order to restore satisfactory temperature conditions in the kiln.

Rings may also occur at other locations in the kiln, especially when the flame is poorly directed. When a ring builds up to any extent the diameter of the kiln at the ring location naturally becomes smaller and the abrupt change in cross-section acts in a manner like an orifice in a pipe-line. A constantly increasing draft at the stack end without a significant change in the hood draft warns the operator that a ring is forming. Such a warning, when observed, frequently enables him to manipulate the calcination process to prevent the ring from growing rapidly to a stage that would interfere with continuous kiln operation.

Heat Intensity.—Knowledge that control of several variables, especially temperature, may be effectively accomplished through systematic draft regulation, indicates the need for some means of determining temperature. Temperature represents a measure of heat intensity. A measure of heat intensity is very essential since we depend upon the proper application of heat to bring about the mineral changes necessary in the production of cement, lime, gypsum and other products.

Heat Supplied to the Cement Kiln.—In a broad sense the distribution of heat supplied to a kiln is divided between heat utilized and heat lost as follows:

1. Heat absorbed by the kiln feed to:
   (a) Dry the raw material.
   (b) Raise the temperature of the raw materials to the point at which carbon dioxide is removed from the limestone.
   (c) Completely drive off carbon dioxide to form calcium oxide (lime).
   (d) Raise the mass to a temperature at which incipient fusion occurs.
2. Heat radiated through liners and kiln shell to the air.
3. Heat lost in exit gases. This may vary widely, varying with:
   (a) Heat lost due to excess air.
   (b) Heat lost in the form of combustible gases.

Temperature Measurements; Stack Temperature.—To assist the kiln operator in maintaining uniform temperature conditions, several devices created to measure temperature are available. Stack or feed-end temperature is usually measured by thrusting, directly into the heated area, a device capable of converting the effects of heat (energy) upon it into electrical effects (energy), which can be measured and transferred to the kiln operator in terms of temperature. Such a device applicable to high temperature is termed a thermocouple.

The worth of definite knowledge relative to stack temperature is evidenced by the fact that a great many cement plants have standardized the calcining operation principally upon this measurement considered in correlation with the draft drop through the kiln.

The method depends largely upon the assumption that the rate of fuel feed can be held unchanged and the inside dimensions of the kiln are constant. Practically, if these conditions could be maintained, there would always be a definitely uniform loss in the amount of draft through the kiln for any specific rate of air flow. Similarly, stack temperature would be proportional to the velocity of the gas flow through the kiln. Therefore, to measure the draft drop through the kiln and the temperature of the gases in the stack would be a rather definite indication of kiln conditions.

Hot-Zone Temperature Determination.—Among the devices for determining hot-zone temperature, portable and stationary types of optical and radiation pyrometers seem most practical. Both measure out of direct contact with the heated area.

The optical pyrometer enhances the operator's physical attempt to measure temperature by "seeing" and comparing colors. The radiation pyrometer measures temperature by the method of "feeling" the intensity of the heat. It measures radiated heat by its effect upon tiny thermocouples which in turn convert the heat intensity effect into measurable electrical effects.

Illustrative of the radiation type instrument in use for making a continous record of hot-zone temperature, Figure 4 (Leeds & Northrup Company) represents a typical installation. The radiation collecting tube, which is very sensitive to even slight temperature changes, is sighted directly upon the kiln lining through a small opening in the hood—a very simple mode of attachment. Lead wires seen attached to the tube carry the electrical current developed, to a potentiometer recorder of the type shown in Figure 5.

One operator responsible for cement-kiln output doubted the value of such instruments. He believed the temperature indications given were not the exact existing temperatures. This, if true, is not a serious fault, since the value of the measurement as an indicator of conditions lies principally in the fact that instruments measure with the same reliability continuously. They serve to enable the proper comparison of results, and control in reality is essentially a correlation of a number of variables which make for uniformity in operation.

Observe Figure 6, which shows a chart record of hot-zone temperature conditions in one of the kilns shown in Figure 4. The chart on the left was recorded during a period when the operator was not allowed visual access

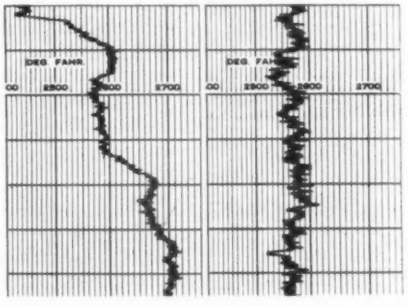


Figure 6. Charts recording comparatively, illustrating the guidance advantage of continuously-recorded hot-zone temperatures.

to the recorder. He fired entirely by the earlier method, depending upon his eye to discern temperature conditions, and smoke issuing from the stack to determine combustion conditions. Imagine his surprise when he learned he could eliminate wide temperature fluctuations, recorded on the left hand chart during his lack of instrument guidance, and turn his operation into one far more uniform, as the chart on the right depicts, merely by having the visual aid of the instruments and believing in the records they made. This operator found he cold "tell" temperature by means of instruments practically as readily as he could "tell" time by means of a clock.

The Idea of Rate.—Many processes of manufacture involve operations through which the cost of production as well as the quality and the uniformity of the finished product may be, to a degree, dependent upon rate of motion; that is, speed or "how fast" equipment is moving. Particularly this is true in those mineral industries where calcination

constitutes a step in the process of manufacture.

Though considerable attention has been given in this article to temperature, just to maintain a definite temperature within the kiln is not enough to assure a satisfactory product. There must be a rather close balance maintained between temperature, the quantity of raw material entering the kiln, and the rate at which it travels through the progressively increasing temperature zones.

The individual and relative rates of rotation or speed of the kiln and the raw-material feeder govern the quantitative flow of material through the kiln. It is important that some means be applied to measure and secure accurate knowledge of the kiln and feeder speeds as well as any changes that might be caused to take place in them in the work of controlling the calcination procedure.

The group of instruments shown in Figure 7 (Esterline-Angus Company) illustrate types of measuring devices available for indicating and producing graphic records that form an accurate picture of kiln and feeder performance. The fully-inclosed magneto-type tachometer-generator may be attached directly or by means of a belt to any revolving shaft. The generator develops an electric current in proportion to the speed at which it is driven. Consequently, with any change in kiln speed there is a proportional change in tachometer-generator speed and the results may be observed with the speed indicator or by the graphic chart of the recorder, either as revolutions per minute or kilowatt input to the kiln or feeder.

Independent or Unit Control?—The speeds of the feeder and kiln may be measured and controlled independently. However, this method does not usually result in a very uniform flow of raw material into the kiln and any lack of uniformity in feed shows up as an equivalent or greater lack of uniformity in the finished product.

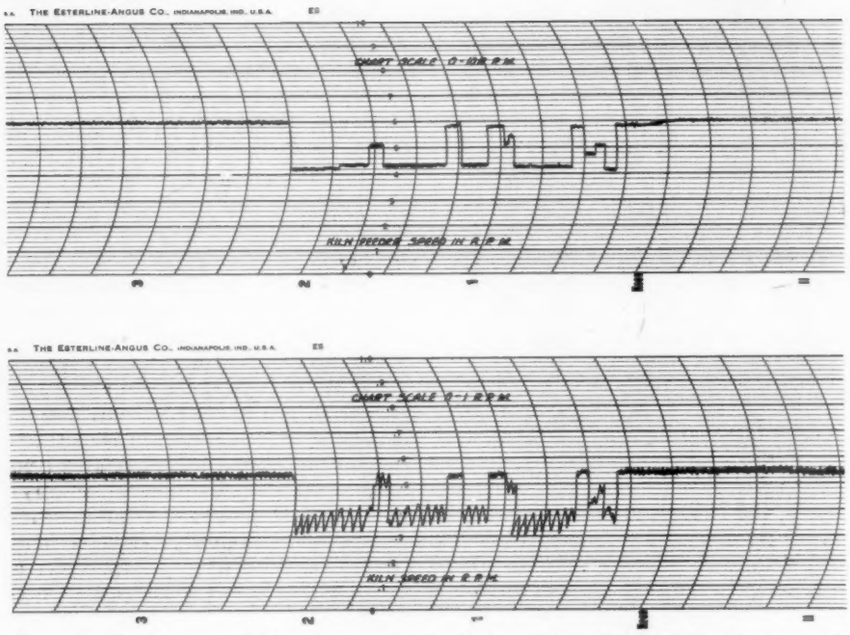

THE ESTERLINE-ANGUS CO., INDIANAPOLIS, IND., U.S.A.
CHART SCALE 0-100 R.P.M.
KILN FEEDER SPEED IN R.P.M.
THE ESTERLINE-ANGUS CO., INDIANAPOLIS, IND., U.S.A.
CHART SCALE 0-1 R.P.M.
KILN SPEED IN R.P.M.

Figure 8. Graphic records showing a constant relative relationship maintained between kiln and raw-material feeder speeds in a cement plant.

In order to manufacture a more uniform product it has been found that the depth of material flowing through the kiln should be as nearly as practical the same at all times. This condition can be most nearly accomplished when the raw-material feeder drive is arranged in a way that any change in kiln speed automatically causes a proportional change in feeder speed in the same way, faster or slower as the change may be.

There are several satisfactory methods for maintaining this constancy of relationship. One way is to connect the feeder drive directly, through a mechanical system of shaft and gears or chains, to a variable-speed motor which also drives the kiln. Another method, perhaps more frequently used, is to drive the feeder and the kiln by two separate motors but to have the two motors synchronized through the use of alternating current of varying frequencies. Either arrangement insures that a quantity of raw material, always relatively the same in proportion to kiln speed, will enter the kiln regardless of the rate at which the kiln is rotating.

The positive results obtained are illustrated in the graphic records shown in Figure 8 (Esterline-Angus Company). Observe the close coördination between the kiln speed and feeder speed, immediately as the kiln speed was changed the feeder speed also changed, thus insuring a constant uniformity in kiln loading.

Why Change Kiln Speed?—With kiln and feeder speeds synchronized in the suggested manner, changing the kiln speed is, as indicated, a major manipulative procedure that may be varied to correct a condition of the kiln when the temperature becomes too high or too low to produce the quality of product at the rate desired. Principally, this is a method of temperature control possible because the amount of fuel being burned in the hot zone is not usually changed with changes in the kiln speed.

By increasing the speed of the kiln the amount of material flowing into the hot zone in any definite period of time is increased. Consequently a large quantity of heat is absorbed rapidly. This reduces the hot-zone temperature, since the amount of fuel burned remains unchanged. When the speed of the kiln is reduced, the amount of

(*Continued on page 42*)

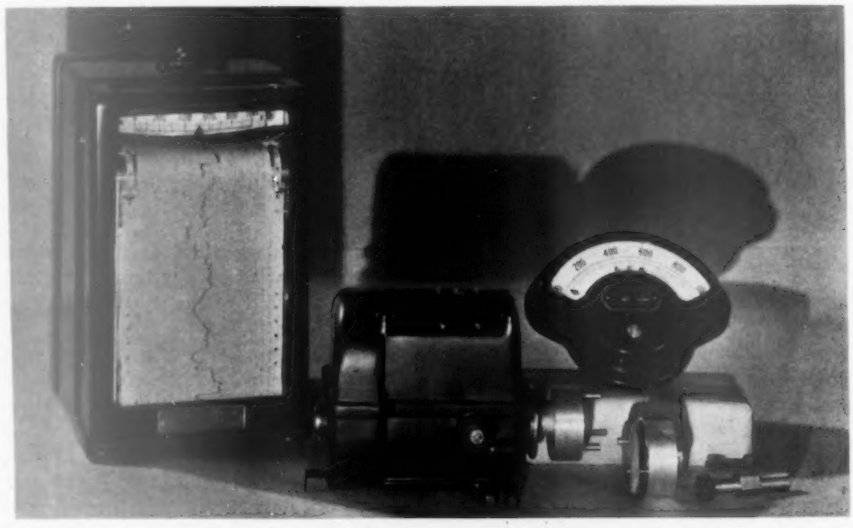


Figure 7. Speed-measuring devices applicable to measuring the rate of rotation of rotary kilns and raw-material feeders.

THE WAR'S EFFECT ON CONSTRUCTION*

By THOMAS S. HOLDEN
Vice President, F. W. Dodge Corporation

IT seems to me that responsible business and professional men should try their best in these times to form their judgments and steer their courses on the basis of facts. Fears and expectations of potential disasters are perhaps natural, but they are very untrustworthy road maps. I purpose to examine with you those facts of our present situation which seem pertinent to the welfare of the construction industry and significant of possible future trends.

The economic status of the United States at this time differs from that of 1914 in at least six important particulars, all indicating a greater state of preparedness for meeting the dislocations of a general European war than existed twenty-five years ago.

1. *Financial Preparedness.*—In 1914 we were still a debtor nation, with a rudimentary central banking system. The Federal Reserve System was a two-year old infant. Fear of the dumping of large blocks of foreign-owned securities caused the New York Stock Exchange to close for five months. Mortgage lending was still conducted according to the simple pawnbroking principles of the horse-and-buggy era, causing period stoppages of the flow of funds into private new construction.

In contrast to this 1914 situation, we are to-day a creditor nation with the largest financial resources of any country in the world. Our twenty-seven-year-old Federal Reserve System has weathered a World War, a post-war deflation, the boom of the 1920's, and the great depression; our banking system is flexible enough to stand enormous strains, to support with relative ease almost any potential business or industrial development. We have within the past few years transformed housing finance into a modern long-term credit system; there is to-day ample mortgage money available for financing any increased volume of private construction that could reasonably be expected to take place, war or no war. Instead of a panic in the stock market, a speculative boom has been going on in the wide-open exchanges of the country.

2. *Business Preparedness.*—Business leadership to-day, in contrast to 1914, is seasoned to withstand shocks, to quick adaptation of production and sales policies and plans to rapidly changing conditions. In August, 1914 general business activity was on the downgrade and continued downward until war orders turned the tide the following year. Construction activity in 1914 was also in the middle of a downswing of the cycle.

In August, 1939, general business and private construction were both in a generally upward recovery movement. The Federal Reserve Board index of industrial production was 102, compared with 92 last April and May. Construction contracts awarded in the 37 eastern states during the first eight months of this year reached a total 25 per cent. greater than in the corresponding period of 1938, and represented the largest current volume of activity since 1931.

3. *Material and Man-Power Preparedness.*—We have to-day, as we did not have 25 years ago, surplus stocks of many agricultural products and other raw materials, unused manufacturing plant capacity, and a large reserve of unemployed man-power. Additional demands for many of the commodities we produce, whether these demands come from quickened domestic activity, war orders, or the preparedness program of our government, can be met without undue strain on our economy and without inflationary expansion of our productive facilities.

4. *Price-Policy Preparedness.* — The tendency of a general war is practically always toward price inflation, and this seems likely to operate this time as it always did before. Some price increases have already been announced, and some of these have already suffered a reaction. Very few price increases can be justified to-day on the basis of actual or potential shortages. Business men and leaders in the building industry remember the disastrous post-war price deflation of 1920, and the more recent experience of 1937 is fresh in everyone's mind. The building industry recognizes that, more than ever before, the potential demand for its product is in the moderate-price field and that rapidly rising building costs would do more to curtail private construction at this time than any other factor in the situation, actually or potentially.

There are strong reasons for expecting general commodity price increases which will be moderate, rather than spectacular, in the months just ahead. The housewives' boom of sugar prices has collapsed. U. S. Steel, bellwether of industry, has announced that current quotations will be maintained through the fourth quarter. An official statement issued September 19 by Howard Coonley, president of the National Association of Manufacturers' said:

"Industry opposes profiteering — the utilization of war psychology to boost prices for the purpose of making excess profits. As manufacturers we recognize it to be our responsibility and our moral obligation to conduct our business so that the prices of the products we produce and sell are related equitably to production costs. We pledge our energetic support to this policy."

It is devoutly to be hoped that suppliers of materials and that building labor will follow this policy of restraint that has been adopted by important leaders of industry.

The government itself is watching commodity prices very closely and will utilize every means at its disposal to curb runaway markets.

It is not necessary that building costs remain on a dead level, in order that they may not be a curb on private building demand; it is only necessary that their upward movement be no more rapid than general commodity prices or rises in the cost of living.

5. *Government Preparedness.* — Our government has made extensive studies of the possible effect of a general European war on our economy, and has made very careful plans for military, naval, industrial, and financial preparedness. We who have only fragmentary knowledge of those plans can not pass upon their thoroughness or their soundness, but their existence assures us that shocks and surprises can be met, and that the minimum of time will be needed to formulate new programs to meet whatever contingencies may arise. There is strong reason to believe that the preparedness plans of government contemplate a closer and more genuine coöperation with business than we have seen in recent years. Government defense plans will obviously have a direct effect on certain types of public construction, and will influence private industrial and utility construction.

6. *Psychological Preparedness.* — Recurrent crises in Europe made the possibility of war evident to us all. The behavior of the stock market indicates an absence of panic. The public reaction to the Athenia incident points to absence of emotionalism. Informed people in this country are aware of those developments in 1914, 1915, and 1916, which led us into a war declaration. These facts and the sober statements of business leaders seem to in-

* Presented at the Sixteenth Semi-annual Meeting of the Producers' Council, Inc., Washington Hotel, Washington, D. C., Tuesday evening, September 26, 1939.

dicate that, in spite of sporadic evidences of war jitters, Americans generally are better prepared to keep calm and sane than we were twenty-five years ago.

These six sets of facts, general as they are in their nature and in their significance, have been enumerated for two important reasons.

In the first place, private building activity has been on a relatively high level during the past twelve months. It has been largely stimulated by a firm demand for new residential building and helped by low interest rates on F.H.A.-insured mortgages. That upward movement of residential building has, I believe, reached the stage where it needs to be sustained by increased general business and industrial activity, increased employment, and increased purchasing power. Such increases were in evidence before September 1, and are far more likely to continue in the upward direction than to suffer a reversal of trend. Thus, at this time, residential building, as well as commercial and industrial building, is closely dependent on the course of general business activity.

In the second place, it seems necessary to point out the highly significant differences between our 1939 situation and the one in 1914, in order to dispel the notion, apparently held by many people, that the course of construction activity this time must parallel in detail the course it followed from 1914 through 1918 and the deflation years that followed. The notion, widely held, that particular courses of action in this country are inevitable is patently absurd. It is not at this time inevitable that the United States will enter the war. If we should do so at some future stage, it is again not inevitable that we will put four million men in uniform and send two million of them overseas. It is not inevitable that our government will find it necessary to mobilize completely our industries, our materials and our man-power, that civilian activities will be sharply curtailed and private building operations so carefully rationed that they will nearly cease. We can not know these things to-day; we can only wait to see what happens. I can not emphasize too strongly that, as the situation stands to-day, a far greater potential deterrent to continued private building activity exists in the possibility of rapidly rising building costs than in any war development of which we have any definite knowledge.

The construction record of the first half of September shows not the slightest effect from the outbreak of hostilities in Europe. Total contracts had a value 41 per cent. greater than in the first half of September, 1938, and this increase was shared by residential and non-residential building and heavy construction; the increase was approximately the same for privately financed and for publicly financed work. Admittedly, this two-weeks' record of wartime construction does not prove very much about future trends, but it is at least a fact instead of a rumor or a guess, and therefore, has a value to us in appraising our situation.

Private construction and general business and industrial activity are approximately midway in a broad general recovery up-swing. Recent improvements in industrial and business activity tend to increase employment, purchasing power, residential, industrial, and commercial building. It will not be surprising to see a moderate, short, seasonal down-swing in private building contracts during the next four months, which might probably have taken place if there were no war. The stimulus of increased business activity and of possible war orders will probably take effect slowly at first. The prospect of price inflation acts as a stimulant to private building; it encourages people who have plans already made to let their contracts in advance of the expected rise; it encourages real estate investment as an inflation hedge. Actual building cost increases may be a deterrent, depending entirely on the rapidity of the rise relative to rents, other living costs, and general commodity prices.

People are also saying that higher interest rates are in prospect. I should guess that they are, but that they will apply more immediately to government bonds and commercial loans than to mortgage loans. If we compare our records on mortgage rates with those of other countries whose mortgage-banking systems were modernized long before ours was, we will find that mortgage interest rates in this country have only recently begun to be normal. Mortgage rates in this country may stiffen a little, but I believe the prospect of their rising to the point of discouraging private building is remote. Availability of mortgage money will depend upon the lending policies of institutions, not on any scarcity value.

At this moment it seems to me the odds are considerably in favor of moderately increased private construction next year. Private residential building should equal or possibly better this year's record; commercial and industrial building and privately-owned utility construction should increase.

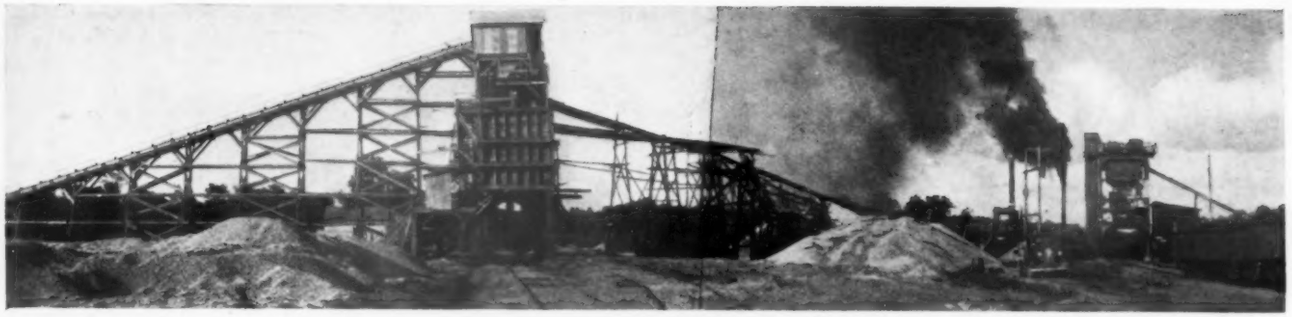
Publicly-financed construction was due for a smaller and a modified program in 1940 even before the war started, as shown by the refusal of the Congress in the last session to authorize a large Federal spending program. Federal expenditures under the new conditions will undoubtedly be directed toward defense and preparedness purposes and diverted away from public improvements of a civilian character. Undoubtedly, considerable sums will be spent for construction for military and naval purposes, for hospitals and highways deemed important in a preparedness program. Little definite information is, as yet, available on which to estimate next year's probable volume of public non-residential building and heavy engineering work. A fair guess is that the total will be somewhat less than it has been in 1939. Public housing activity may be expected to increase in volume. Many contracts are still to be let under the original $800,000,000 loan authorization. While the United States Housing Authority's request for an increased authorization was rejected at the last session of the Congress, I think it is fair to assume that this country is committed to a public housing program. The next regular session of the Congress will be requested to again act upon this matter. It may require amendments to the U. S. Housing Act and modified administrative policy, in order to get the financing procedure on a sane basis, a consummation devoutly to be wished, but it will very likely authorize a continuation of the program in some form. Speeding up of industrial activity in particular centers may create housing shortages calling for both private and public housing projects not yet contemplated.

Rothrock (*from page 40*)

material flowing into it is likewise reduced and heat is absorbed at a lower rate. This allows the hot-zone temperature to rise.

Among other irregular happenings that sometimes make it desirable to change the speed of the kiln is the formation of rings. As has been said, rings reduce the inside diameter of the kiln and correspondingly affect the rate of flow of material through it. Then, too, occasionally large masses of partially burned material suddenly slide or flush unexpectedly into the hot zone. To level out the operation under these circumstances it is necessary to change kiln speed.

Such occurrences coupled with variations in the physical and chemical properties of the raw materials and the necessity of causing definite minerals to form for the finished product, considered along with the fuel economy hoped for and the effective kiln production capacity planned upon, make measurement for guidance and control of speed one of the essential measurements favorable to a high volume of production with considerable reduction in operating costs.



A composite picture showing the new sand and gravel plant of the Tuskegee Sand & Gravel Company at left and the new aggregates-bituminizing plant at right.

BITUMINIZING AGGREGATES IN ALABAMA

By W. E. TRAUFFER

EARLY in the summer of 1938 the Tuskegee Asphalt Corporation put in operation an aggregates-bituminizing plant on the property of the Tuskegee Sand & Gravel Company near Tuskegee, Alabama. This is a Warren Brothers plant with a capacity of 100 tons per hour and is said to be one of the largest plants of its kind in the south. When it went into operation orders were on hand for 20,000 tons of cold mix from the Alabama highway department, 15,000 tons from Alabama municipalities, and 13,100 tons from Georgia municipalities. This material is shipped by railway for distances up to 200 miles. Trucks are used for shorter hauls.

Gravel is hauled by truck from the aggregates plant, and fine sand from this plant is sluiced alternately into two piles. One pile is built while the other is being used. Withdrawing sand from them alternately gives each pile 24 hours in which the water can run off. A crane feeds sand and gravel from the stock-piles to the hoppers of two elevators feeding the combination drier and cooler. This machine consists of a 5½- by 18-foot drier followed by a 5½- by 24-foot cooler section. Lifters in the end of the drier discharge the dried materials into a chute feeding the cooler. Between the two drums is a draft chamber connected to a Sturtevant exhauster fan and a stack. Hot air is drawn through the drier in the direction of the material flow and cooling air is drawn through the cooler in the opposite direction. No attempt is made to complete the drying process in the drier. The best results have been obtained by leaving some moisture in the hot material which enters the cooler at a temperature of 170 to 180 degrees F. The contained heat causes evaporation of the remaining moisture which, with the large volume of cooling air, induces rapid cooling. The material leaves the cooler absolutely dry and at a temperature 5 to 10 degrees below that of the atmosphere.

The drier combustion chamber is mounted on tires and rollers so that it can be rotated at intervals to prolong the life of the lining. The cooler can also be fitted with a combustion chamber and burner, if desired, for the production of hot mixtures.

The dried aggregates are discharged from the cooler to a bucket-elevator feeding a revolving screen. This produces sand and three sizes of gravel, which are discharged into a 4-compartment steel bin. These materials are fed into a Warren weighing batcher equipped with a Howe dial scale and this in turn feeds a 2-ton Warren mixer. The asphalt is weighed in a steam-jacketed bucket with distributing nozzles on the bottom. This bucket is equipped with a Howe 2-beam scale and a tell-tale dial. The liquefier is measured by a Buffalo registering meter and is sprayed into the mixer through a perforated pipe. The finished product is discharged from the mixer through steam-operated gates into cars or trucks for shipment.

The bitumen is received in tank cars, from which it is pumped into a 25,000-gallon vertical cylindrical tank, which has a 3,500-gallon central hot chamber equipped with steam coils. This arrangement makes it unnecessary to heat the entire contents of the tank as the material slumps from the sides toward this central chamber for more intensive heating before it is used. A patented perforated sleeve prevents clogging as the material is fed to a pump which supplies the plant.

The liquefier is stored in a 10,000-gallon tank, from which it is fed to the plant by a 2-inch Blackmer pump. Fuel oil is stored in an 8,000-gallon tank, a Worthington Duplex pump supplying the drier burner. Steam for all the operations is supplied by a 50-horsepower oil-fired boiler.

The officers of the Tuskegee Asphalt Corporation are: W. M. Blount, president; H. M. Warren, vice-president; W. J. Baldwin, secretary. Mr. Blount is also vice-president and general manager of the Tuskegee Sand & Gravel Company.

Another view of the asphalt plant showing the drier-cooler. The sand flume is at the left.

By W. E. TRAUFFER

Rush Construction of Huge Plant to Furnish Aggregates for Shasta Dam

WITH the Grand Coulee Dam rapidly nearing completion the center of the stage is now occupied by the Shasta Dam of the Central Valley Project of California which apparently will provide a continued development of interesting methods of dam construction and aggregate production. The Coulee Dam sand-and-gravel plant provided an interesting study in the production of suitable concrete aggregates from a deposit which was extremely low in gravel and extremely high in very fine sand. The deposit from which aggregates for Shasta Dam will be supplied contains an excess of 3-inch to 6-inch gravel which will be crushed to balance up the other sizes of gravel. There is also a small percentage of soft rock which must be removed by scrubbing. The percentage of deleterious matter is high and in order to insure its complete removal most of the minus 48-mesh sand will be wasted. The resulting deficiency in fines will be made up by grinding some of the smaller sizes of gravel.

Construction view of tunnel for storage and blending of the three sand fractions.

General view of the plant site showing the main aggregate-storage tunnel.

The Central Valley Project has been widely described in construction magazines. Briefly it is a project of the United States Bureau of Reclamation to provide flood control, irrigation water, and power for the Central Valley of California, which extends from the head-waters of the Sacramento River near Mt. Shasta to the head-waters of the San Joaquin River near Fresno. The valleys of these two rivers, the largest in the state, and their tributaries, drain an area nearly 500 miles long and up to 120 miles in width. These valleys, which contain a large part of the most fertile land in the state, are semi-arid and have been developed almost to the maximum point possible under existing conditions. Their further development and the consolidation of the land already improved depends on the flood protection and additional water supplies which will result from the completion of the Central Valley Project.

The Shasta Dam is the largest single unit in this program. It will dam the Sacramento River at a point about 10 miles north of Redding, California, forming a storage reservoir of 4,500,000 acre-foot capacity. A power-house located at the dam is designed to develop 375,000 kilowatts. The dam will be of the massive concrete gravity type, about 3,500 feet in over-all length on the crest and about 560 feet in height from the lowest point of the foundation. It will be the highest dam of the overflow type in the world, exceeding Grand Coulee by 10 feet and is the second largest concrete dam ever built. The volume of concrete in the dam will be 5,400,000 cubic yards as compared to 3,250,000 cubic yards in Boulder Dam and 10,500,000 cubic yards in Grand Coulee. About 5,800,000 barrels of low-heat cement will be required and this will be supplied from the 7,000-barrel cement plant now being built near Los Altos, California, by the Permanente Corporation. Pacific Constructors, Inc., has the contract for mixing and placing the concrete in the dam.

The Columbia Construction Com-

pany, Inc., was awarded the contract for 10,400,000 tons of sand and rock (gravel) which are to be delivered over a 5-year period. This company built Bonneville Dam and was associated in the building of Grand Coulee Dam. On its staff are the men who built and operated the sand-and-gravel plants supplying those projects. Their invaluable experience has been drawn upon in the design of this plant, which is patterned to a considerable extent after those plants.

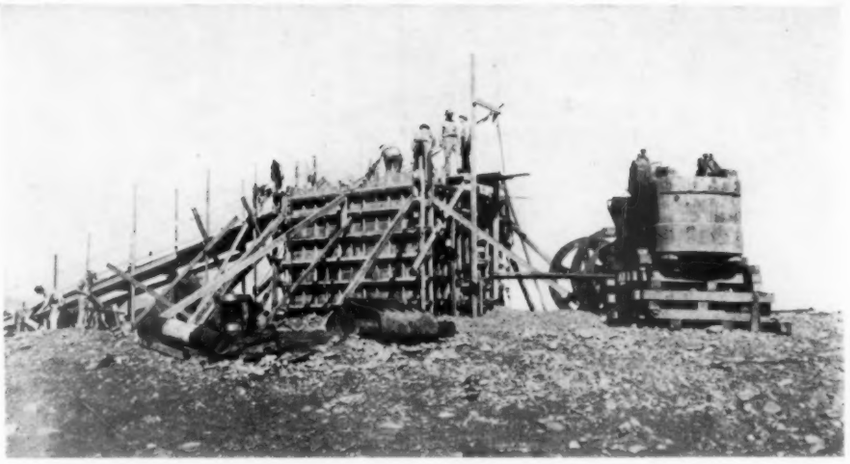
This plant is designed for a raw-material feed of about 1,000 tons per hour, but this will probably be exceeded in actual operation. It is expected that sand will be wasted to the extent of about 15 per cent. of the raw feed.

Building of the plant was started September 10 and it is expected to be in operation late in December of this year. Judging from the progress made at the time of the writer's visit early in October the latter date is conservative.

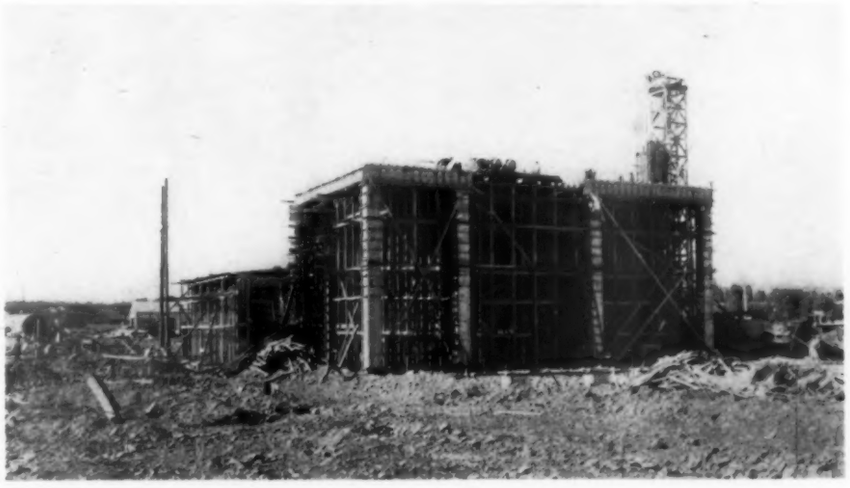
The deposit is in a dry river bed near Redding, California and averages 32 feet in depth. An 8-cubic yard drag-line and a 5-cubic yard drag-line, both Bucyrus-Monighan, will be used in the pit. These will feed a hopper on a pendulum feeder belt-conveyor which in turn will feed a field conveyor. A Productive Equipment Company Selectro scalping screen with 6-inch openings will divert oversize material into a Farrel-Bacon jaw primary crusher set to produce 6-inch minus material. The material passing through the screen, together with the crusher product, will be taken by a belt-conveyor to a raw-material-storage pile with a live storage capacity of 8,200 tons.

This 6-inch minus material will be withdrawn from storage by a reclaiming belt-conveyor in a tunnel under the pile. A Merrick Weightometer on this conveyor will keep a record of the amount of sand and gravel put into the plant and make possible accurate control of the rate of feed. All the conveyors up to this point have a capacity of 1,250 tons per hour. Two pairs of 5-foot by 10-foot Tyler Ty-Rock screens operating in series will remove all the sand (minus ¼-inch) from the gravel. They will be equipped with high-pressure water jets.

Sand from the four sizing screens will be discharged into an 8-foot by 11-foot Allis-Chalmers "slug" mill which is a ball-mill loaded with ¾-inch by 1½-inch flat steel washers. This mill will grind up the pit-run sand containing the deleterious matter. The mill will be followed by a Dorr hydroseparator with a 20-foot diameter bowl and a 9-foot by 30-foot rake. The minus 100-mesh bowl overflow and most of the minus 48-mesh rake overflow, containing most of the deleterious material, will go to waste. The 4- to 28-mesh



Crusher building under construction. Primary jaw-crusher at the right.



The mill building under construction.

The 5-cubic yard drag-line which will be used in the pit. Scalping screen in foreground near bucket.

rake product will be discharged by a 24-inch belt-conveyor to a storage pile with a live capacity of 2,250 tons.

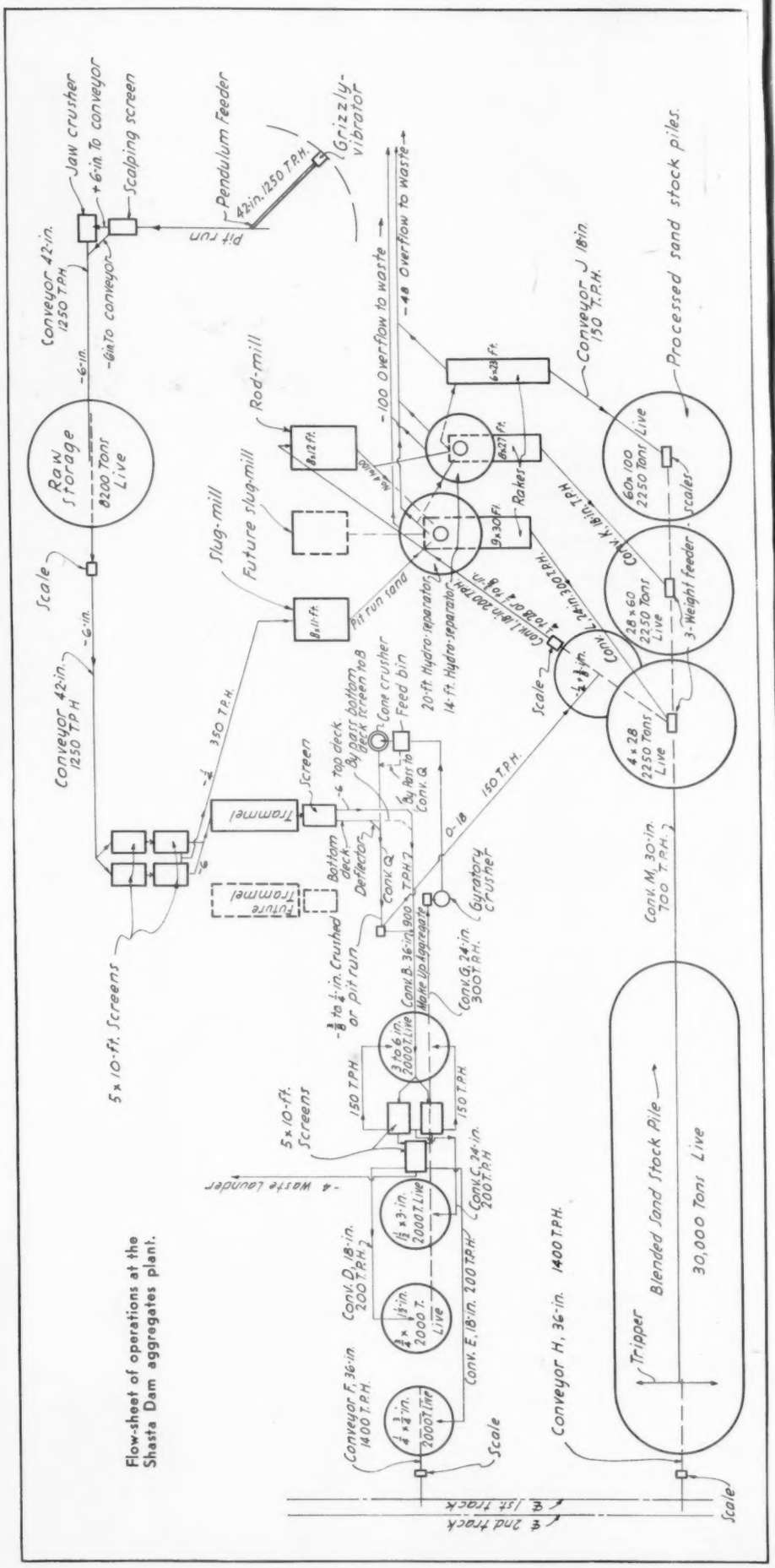
The gravel will be discharged from the last of the two pairs of screens to an 8-foot by 30-foot Hendy revolving scrubber screen. A 5-foot by 10-foot Tyler Ty-Rock screen following the scrubber will remove ¼- to ⅜-inch material from the gravel. This material

A view of the progress on excavation at Shasta Dam. Head tower and concrete plant will be on far side.

can be discharged on a 36-inch belt-conveyor running to the final screening building along with the gravel or on another (18-inch) conveyor to a storage pile near the sand storage. An 18-inch belt-conveyor in a tunnel under this pile will feed this material to an 8-foot by 12-foot Marcy open-end rod-mill. A Merrick Weightometer on this conveyor makes possible the control of fineness by controlling the rate of feed of this material which will make up for deficiencies in the sand.

The product of the rod-mill can be split in any desired proportions to the 20-foot hydro-separator already mentioned or to a second Dorr hydro-separator which has a 14-foot diameter bowl and an 8-foot by 27-foot rake. The 28- to 60-mesh product of the rake is carried on an 18-inch belt-conveyor to another 2,250-ton live storage pile. Part of the rake overflow and the bowl overflow are wasted. Some of the rake overflow will also go to a 6-foot by 33-foot Dorr rake classifier from which the overflow will also be wasted. An 18-inch belt-conveyor will feed the 60- to 100-mesh product of this rake to a third processed-sand storage pile with a live capacity of 2,250 tons.

A single reclaiming tunnel under the



Flow-sheet of operations at the Shasta Dam aggregates plant.

three sand stock-piles houses a 30-inch belt-conveyor feeding a large blended-sand stock-pile. A Merrick Feedoweight under each of the three piles will blend the three gradations of sand in any desired proportion on this belt-conveyor, which has a capacity of 700 tons per hour. The blended-sand stock-pile has a live-storage capacity of 30,000 tons. A 36-inch belt-conveyor in a tunnel under this pile will be able to load sand for shipment at the rate of 1,400 tons per hour. This conveyor will also be equipped with a Merrick Weightometer.

The minus 6-inch gravel is to be discharged from the conveyor to the

Close-up view of one of the wooden tunnels under construction.

screening building to a pair of 5-foot by 10-foot Tyler Ty-Rock 2-deck screens. The 3-inch to 6-inch and 1½-inch to 3-inch products of these screens will be discharged by gravity to separate stock-piles with live-storage capacities of 2,000 tons each. The gravel passing through these two screens will go to a third similar screen. The ¾-inch to 1½-inch and ¼-inch to ¾-inch products of this screen will be carried by separate 18-inch belt-conveyors to two more 2,000-ton piles.

Under the four gravel stock-piles will be a tunnel housing a 36-inch loading conveyor with a capacity of 1,400 tons per hour and a 24-inch return belt-conveyor of 300-ton per hour capacity. A Merrick Weightometer on the loading conveyor will keep a record of gravel shipments. The return conveyor will

Four of the vibrating screens awaiting installation.

One of the Diesel truck-trailer units which delivers cement from the Calaveras cement plant 300 miles distant.

feed any desired size of gravel to a crushing circuit, which will produce make-up aggregate to be fed to the rod-mill along with the pit-run material. A gyratory crusher will be used to reduce the coarser sizes to 1½ inch maximum. An 18-inch conveyor will feed the crusher product or the minus 1½-inch gravel by-passing this crusher to a 4¼-foot Symons cone crusher.

Original plans called for the delivery of the sand and gravel to the dam site by railway, a haul of about 13½ miles. An alternative plan was also worked out to deliver by means of a series of belt-conveyors totalling nearly 9 miles in length, far exceeding in length any other belt-conveyor system ever installed. The plan was recently approved by the Bureau of Reclamation.

The concrete-mixing plant at the dam site will be identical in design with those operated at Coulee Dam. It will be a tower-type fully-automatic plant designed and equipped by the C. S. Johnson Company. Five 4-cubic yard Koehring mixers will be used and there will be plant-bin storage for 4,000 tons of sand, rock (gravel) and cement. The average run is expected to be 6,000 cubic yards of concrete in 24 hours, but the plant will be capable of manufacturing considerably more than this amount. A stock-pile storage of 150,000 tons live capacity is to be connected to the plant by a series of 36-inch belt-conveyors totaling 4,500 feet in length. Concrete is to be placed in the dam by means of seven 20-ton cableways with movable tail towers radiating from a 460-foot stationary steel head tower.

N. S. & G. Assn.

(from page 36)

of the exemption of seamen under the Federal wage-and-hour law.

Features of the 1940 convention program were discussed. Among the suggestions offered were: "round-tables" on labor relations, on engineering problems (including specifications covering the many uses of sand and gravel), on operating and production problems (including the preservation of equipment); and discussions of the appointment of a collective-bargaining agent by employers and the execution of a uniform agreement to cover groups of producers, guaranteed employment in union agreements, health and safety in the industry (including the physical examination of employees), and group insurance.

The following persons were in attendance:

BOARD MEMBERS AND ASSOCIATION OFFICERS:

V. P. Ahearn (executive secretary), Washington, D. C.
Paul P. Bird, Boston Sand & Gravel Co., Cambridge, Mass.
Charles M. Cadman, Pacific Coast Aggregates, Inc., San Francisco, Cal.
J. Rutledge Hill (president), Gifford-Hill & Co., Inc., Dallas, Tex.
Stanton Walker (director of engineering), Washington, D. C.

OTHER PRODUCERS AND GUESTS

J. Fennel Berger, John O. Roeblings' Sons Co., Trenton, N. J.
W. A. Bliss, Dravo Corp., Pittsburgh, Pa.
H. P. Caldwell, Ohio River Sand Co., Louisville, Ky.
Otto P. Conrades, St. Louis Material & Supply Co., St. Louis, Mo.
Fred P. Curtis, Lyman-Richey Sand & Gravel Corp., Omaha, Neb.
Anderson Dana, Seaboard Sand & Gravel Corp., New York, N. Y.
Alexander Foster, Jr., Warner Co., Philadelphia, Pa.
Floyd C. Fuller, Portsmouth Sand & Gravel Co., Portsmouth, O.
B. V. Hedrick, B. V. Hedrick Sand & Gravel Co., Lilesville, N. C.
Daniel J. Miller, Portland Sand & Gravel Co., Portland, Pa.
H. V. Owens, Eastern Rock Products, Inc., Utica, N. Y.
Stanley A. Phillips, PIT AND QUARRY, Chicago, Ill.
J. O. Eyre Price, Wyoming Sand & Stone Co., Scranton, Pa.
Nathan C. Rockwood, *Rock Products*, Chicago, Ill.
L. W. Shugg, General Electric Co., Schenectady, N. Y.
F. P. Spratlen, Jr., Spratlen-Brannan, Inc., Denver, Colo.
H. H. Stewart, J. K. Davison & Brother, Pittsburgh, Pa.
Irving Warner, Warner Co., Philadelphia, Pa.

Win Damages Due to Relocation of Dike

Appraisers have recommended that the city of Topeka pay not more than $10,000 each to the Kansas Sand Company and Consumers' Sand Company as damages caused by the construction of a dike in the Kansas River.

Total damages of approximately $100,000 were asked by the two sand firms if the city and War Department followed out the original plan of heightening and widening the old dike, which passes through the operations of the Kansas Sand Company. In order to reduce these damage claims, Topeka city officials and the War Department decided to reroute this section of the dike so that it would pass around most of the operations.

FLOOD WRECKS MONTANA GRAVEL PLANT

The Horseshoe Falls at Niagara? Not at all; merely flood water running into the J. L. Shiely pit over a brink 200 feet wide.

WATER can be the salvation of a state, but too much of it, concentrated in too confined an area can, and frequently does, create havoc. This was the case near Saco, Montana, last March when a sudden rise in the waters of Whitewater creek, which runs about 500 feet from the J. L. Shiely gravel pit, of the Becker County-Shiely Company at Saco, broke over the banks into the pit with disastrous results.

Whitewater creek originates near the Canadian border. In summer it is almost dry. The waters of the creek were swollen by melting snows due to high March temperatures. The flood hit two small dams about fifteen miles up the creek from the J. L. Shiely pit. A roaring wall of water struck the pit about 1 a. m. on the morning of March 22 and continued to run until about 4 a. m. on the 23rd. It ran into the east pit, then through the receiving hopper under which are located the feeder and electric motors, then broke over a dyke and ran into the pit proper and flooded the electricity-generating building and electric pump house. The generator produces direct current used to operate the electric "dinky" locomotives that move the gravel cars from the pit to the "hopper." The pump is used to pump water to the main plant for washing the sand and aggregate. This costly equipment is operated with 2300 volts. The electric "dinkies" and generating set are General Electric equipment. The motors and pumps are Fairbanks-Morse. Link-Belt conveyors and feeders were in operation.

The 2,300-volt Marion electric shovel located at the far end of the pit was soon in the water and 16 hours later it was completely submerged to the top of the roof, only the "boom" showing above the water.

The pit is a large one and the water filled it to a depth of about 20 feet before it stopped flowing in.

The descending wall of water in the bed of the stream, which is often little more than a rivulet, was accompanied by a loud roar heard for miles. Ranchers in the vicinity of Whitewater creek moved hastily. There was no loss of life and, except for flooded ranch buildings, flood damage was mostly confined to the J. L. Shiely Company pit and equipment. The damage to the ranches below the pit might have been much more extensive if much of the descending flood had not poured into the pit.

It became apparent that the lowering of the water in the pit to the normal water level would be a slow process. A large 8-inch pump was placed in operation about the first of June, but it required several weeks of constant pumping before the electric shovel could be moved to higher ground.

The fact that the pit was operated exclusively with electricity, of course increased the amount of damage to the equipment. After the waters had receded, the receiving hopper was entirely covered with silt. The pump motor was covered with gravel and would have been carried away except for the

Water running through the receiving hopper, all motors being submerged.

A view in the pit taken about 16 hours after the flood broke over the bank. The "falls" may be seen in the distance, directly behind the telegraph poles.

By N. E. PIERCE, Superintendent
Becker-County Shiely Company

The electric pump-house just before the building became completely submerged.

Another view showing the destruction wrought by the flood.

As the electric shovel appeared just before sunrise on the morning of the flood with the water rising rapidly.

The shovel as it appeared several hours later. The water rose an additional foot before it reached its crest.

fact that it was fastened to a 12-inch spiral pipe. All motors and the entire generating plant were sent to the factory for drying and reconditioning. The pit "dinky" tracks were washed out in places and buried in others.

The work of restoration has proceeded as rapidly as could be expected considering the extent of the damage and the amount of work required to unwater the pit. The cost of reconditioning equipment was about $10 000.

The Cole plant of the J. L. Shiely Company is again in operation, loading about 50 cars per day. The J. L. Shiely Company has furnished all the aggregates for the Fort Peck Dam since 1934 and the Becker County-Shiely Company has furnished all the toe gravel. The peak run was in the summer of 1935 when the plant produced 285 cars of toe gravel in 24 hours. While the Becker County-Shiely Company and the J. L. Shiely Company plants are side by side no damage was done to the Becker County-Shiely Company plant in the March flood as the J. L. Shiely Company pit was nearer the Whitewater creek.

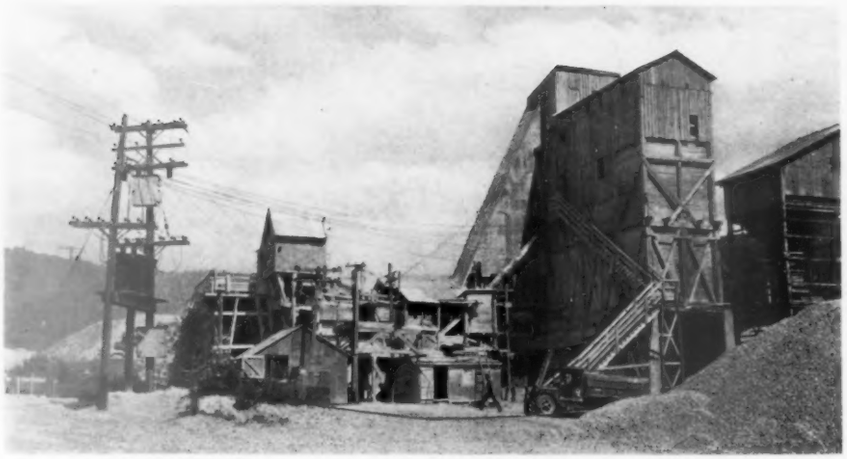
Expect Federal Aid to Remain Unchanged

In order to obtain an unbiased and true picture of the 1940 highway program, conferences have been held recently by the American Road Builders Association with representatives of the Public Roads Administration, War Department, Department of Commerce, State Department, Public Works Administration, and several Congressmen and Senators from among those who take an active part in national highway legislation.

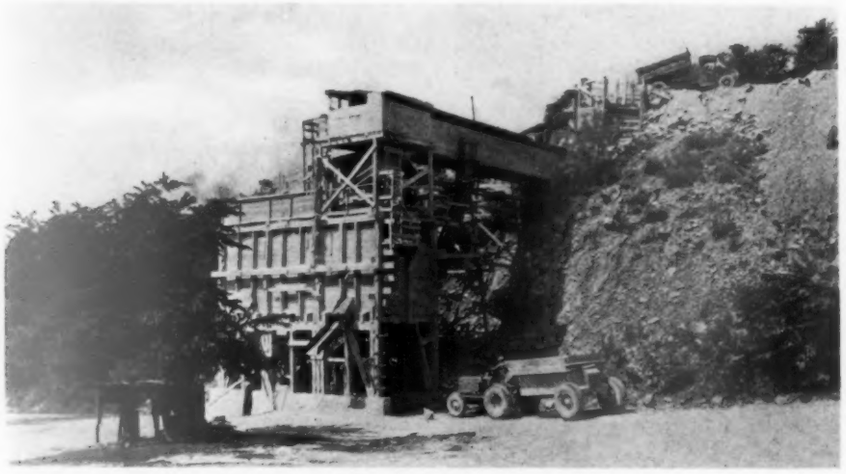
These representatives were, it is reported, unanimous in their conclusions that the authorizations already made for Federal-aid for the fiscal year ending June 30, 1934, will not be disturbed. From a study of the programs of the various state highway departments it appears that these will remain about as they are for the calendar year.

At the next regular session of Congress new Federal-aid highway legislation will come up for consideration. It is expected that the authorizations will be increased over what they are at the present time. This statement is based on several pertinent facts; first, it is thought that the amount of Federal-aid should be more nearly in line with the motor vehicle excise taxes paid to the Federal government; second, there is an absolute need for more defense highways (this has been pointed out by the War Department), third, the report of the Public Roads Administration shows the immediate need for a system of inter-regional and secondary highways to meet traffic demands.

Motorized Fleet Hauls Quarry Stone Down-Grade to Pennsylvania Plant



The main crushing-and-screening plant of Gray Stone Quarries, Inc.



Truck discharging to primary crusher above as trailer prepares to load below.

Three of the tractor-trailer units at the crusher plant.

MANY producers are confronted with a haulage problem in moving stone from deep quarries to their plants. Gray Stone Quarries, Inc., has just the opposite condition at its quarry near Blairsville, Pennsylvania. Stone must be hauled over a mile down a grade varying from 6 to 18 per cent. This is being done with an interesting combination of haulage systems.

This company was organized and its plant built in 1934. In 1937 the plant was enlarged from 300 tons to the present capacity of 1,200 tons daily. At the same time the primary crusher was moved from the main plant to its present location near the quarry.

The deposit of Ligonier bluestone is located on a mountainside at an elevation of about 1,560 feet above sea level. The 1,200-foot quarry face averages 60 feet in height and has a slope of 18 degrees. An average of 20 feet of overburden is removed during each slack season with the quarrying equipment. Blast holes are drilled by a Sanderson Cyclone well drill, one end of which has to be jacked up two feet to make it level. The usual shot consists of about 15 holes in a single row. Electric caps and Atlas Apex No. 2 and Geladyne No. 1 explosives are used. Secondary drilling is done with jackhammers. An Osgood 1½-cubic yard steam shovel and a ⅞-cubic yard Erie steam shovel do the loading. Five Mack trucks haul 7-ton loads of stone a distance of 1,200 feet with a drop of 20 feet to the primary crusher. These trucks have dual rear wheels on which the inner tires have been replaced with lugged tractor-type steel wheels. As only 50 pounds of air is used in the tires on the outer rims the wheel lugs get the best traction when the trucks are loaded going down grade.

The stone is dumped into a Farrell Bacon 36-inch by 42-inch jaw crusher. A belt-conveyor carries the crusher product to a revolving screen which removes the minus ½-inch material containing most of the clay and other impurities. This material is hauled from its bin to a waste-pile. The clean rock over ½ inch in size is discharged into a 60-ton bin.

• By W. E. TRAUFFER

Quarry face showing steep drop to primary crusher. The white ribbon of road in the distance leads to the main plant.

Hauling from the crusher to the main plants was at first done by hired trucks. When it was decided to try another method all applicable types of haulage systems were studied. It was decided to purchase three 10-ton Koehring Traildumps, which were put in operation early in 1938. These consist of 2-wheel bottom-dump trailers fitted with sideboards and hauled by dual-engined pneumatic-tired tractors which also support the front ends of the trailers. Goodyear 13½-inch by 24-inch 16-ply lugged tires are used on the rear wheels of the tractors and on the trailers. Smaller Goodyear lugged tires are used on the front wheels of the tractors. The company has its own grader for caring for its roads which are

One of the tractor-trailers discharging at the plant.

maintained with waste stone containing some clay.

Stone is discharged from the bin into the trailers through a loading box and gate of the company's own design. The loading box has a side opening and stone piled up on a slope forms a chute which takes the abrasion. The strongly-braced wooden gate has an angle iron on the inner side at the bottom which gives it an L-shaped cross-section and holds it out from the box at a slight angle to the perpendicular. A weight on the outside of the gate near the bottom holds it closed firmly enough to prevent spillage. A cable-and-pulley system is used to open the gate, which closes by its own weight. According to H. H. Pifer, superintendent, the gate never sticks and always closes completely.

The tractor-trailers haul the stone a distance of 4,600 feet down grades ranging from 6 to 9 per cent. to the main plant. A round trip is made in 10 minutes and two Traildumps are able to haul 1,000 tons of stone to the plant in 10 hours. According to Mr. Pifer, each Traildump uses only about 1½ gallons of gasoline per hour and hauling costs are much lower than they were formerly.

Stone is discharged from the Traildumps into a No. 14 Kennedy-Van Saun gyratory crusher. An elevator feeds the product to a 4-foot by 10-foot double-deck Kennedy vibrating screen. Stone retained on the top deck goes to a No. 37 Kennedy gyratory crusher from which it is discharged to the same elevator. A No. 19 Kennedy crusher can also be used if desired. The minus ⅛-inch material passing through the bottom deck of this screen goes into a bin for asphalt filler. Most of this is used in two Amiesite Corporation

The double-deck scalping screen.

bituminizing plants on the company's property.

The other product of the screen is carried by another elevator to a 4-foot by 12-foot triple-deck Kennedy screen which makes two sizes over 1 inch. The material under 1 inch goes to a 4-foot by 10-foot triple-deck Kennedy screen which makes two sizes over 1 inch. The material under 1 inch goes to a 4-foot by 10-foot triple-deck Kennedy screen which makes smaller sizes.

The 5-compartment storage bin has a capacity of 300 tons. Shipments are made both by railway and trucks. A Barber-Greene loader is used to load trucks from stock-piles.

Steam shovel loading into truck in the quarry.

Personal Mention

FRANK L. GAUTIER, recently retired president, general manager and a director of the Consolidated Rock Products Company, Los Angeles, California, on October 16 arrived in Los Angeles after a tour of the world. Accompanied by Mrs. Gautier he started out in March of this year visiting Hawaii, Japan, China, the Dutch West Indies (including Bali), India, Egypt, Palestine, Turkey, Greece, Italy, France, Germany, Norway, Sweden, England, Scotland, Ireland and many other countries. They had booked passage to this country on an English boat when the Athenia was sunk and decided to cancel. After considerable delays and many difficulties they finally arrived in New York late in September. In his travels Mr. Gautier had some opportunity to observe the methods of aggregate production. In such countries as India, Egypt, China, etc., little ones are made from big ones by day labor, a method confined almost entirely to penal institutions in this country.

"ALL SCREENING MACHINES ARE *the same!*

Probably all this gent needs is some Carter's Little Liver Pills. For every experienced producer well knows that there's a whale of a difference between screening machines. And that's why it pays to rely on Simplicity gyrating units.

Simplicity screens possess a wealth of outstanding features such as counterbalanced eccentric shaft, rubber-mounted screen corners, screens in four-way tension over doubly-crowned surface, dust-sealed Alemite-lubricated roller bearings and extra rugged construction.

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O. N. LINDAHL, controller, Universal Atlas Cement Co., United States Steel Corporation subsidiary, was elected president of the Controllers Institute of America at the institute's annual meeting held in New York, October 9 and 10.

CECIL F. BOULDEN, structural engineer for the Portland Cement Association in Texas during the past seven years, resigned recently to become chief engineer of the Texas Railroad Commission at Austin.

A. K. HUMPHRIES, formerly vice president, Pacific Coast Aggregates, Inc., San Francisco, has been elected president of the company to succeed CHAS. M. CADMAN, resigned. E. M. GOODPASTOR, formerly assistant general manager, has been elected vice president, general manager and director. Mr. Cadman will engage in other activities, including those related to his personal interests.

BENJAMIN W. CALVIN, president of the Aetna Portland Cement Company, recently went on a hunting trip in Michigan's Upper Peninsula armed with a new, hand-made .12 gage shotgun, a gift from employees at Bay City, tendered him in honor of his recent elevation to the presidency.

W. F. DALY, formerly on the staff of Allis-Chalmers Manufacturing Company's Chicago office, has been appointed district office manager at St. Louis. C. L. ORTH, who has been manager of this office for the past 29 years, will continue in a consulting and sales capacity.

R. K. MANGAN, vice president of the Buda Company of Harvey, Illinois, has announced the appointment of L. F. SHOEMAKER as sales manager of the Automotive and Industrial Division of the company.

THOMAS DAVIS is now in charge of both sales and service of the crusher division, Los Angeles office, Nordberg Manufacturing Company. Mr. Davis has long been associated with the service, installation and operation of Symons cone crushers in the west.

W. C. RODD has been named advertising manager of the Celotex Corporation, Chicago, Illinois, according to an announcement by H. W. Collins, vice president in charge of merchandising. Prior to his appointment, Mr. Rodd was assistant to Mr. Collins.

JOSEPH A. DORN of Wahpeton, North Dakota, has purchased the Ames gravel pit located near Foxhome from the Northern Pacific Railroad and is now operating.

FRANK A. YOUNG, long connected with Allis-Chalmers Manufacturing Company at Milwaukee, has recently been transferred to that company's Pittsburgh district office. Here his activities will largely be identified with the crushing, cement and related industries.

DARIUS S. HUNKINS, 58, president of the Peerless White Lime Company and a vice-president of the Hunkins-Willis Lime and Cement Company, died at his home in University City, a St. Louis suburb, recently. He had been suffering from heart trouble for several months. Surviving are his widow, Mrs. Flora T. Hunkins, and two sons, D. S. Jr. and Fred F. Hunkins.

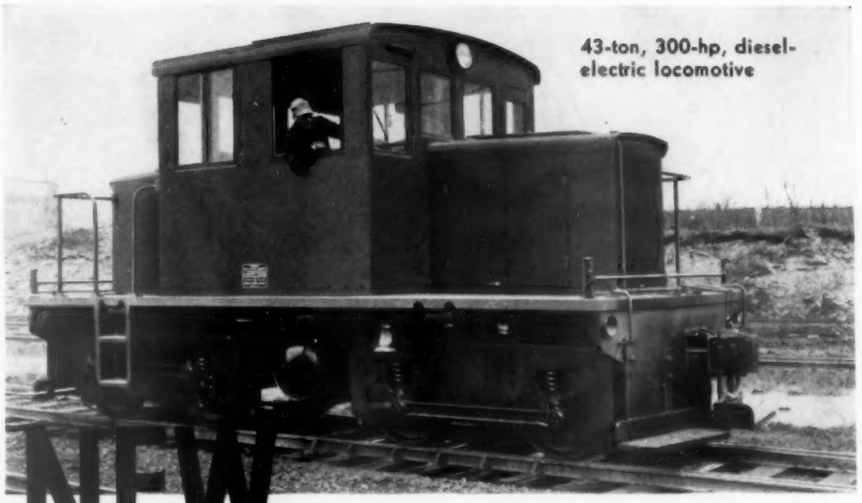
T. FRANK QUILTY, president of the Superior Materials Company, Chicago, and vice-president of the Moulding-Brownell Corp., Chicago, died recently. From 1900 to 1903 he worked as a civil engineer with the city of Chicago. Later with the firm of John J. O'Heron & Company, general contractors, he engaged in the design and construction of the Division Street tunnel under the Chicago River, the approaches to the Louisville & Southern Indiana Railway bridge over the Ohio River at Jeffersonville, and various water supply systems throughout the United States.

Fred L. Mauntler

FRED L. MAUNTLER, vice-president and one of the first directors of the Ohio Hydrate & Supply Company, Woodville, Ohio, died recently at the age of 68 years. He was a well-known figure in the lime industry and was connected with a number of other local enterprises as well, greatly devoted to his family and the work of his church.

WELLINTON C. MACEWEN, 82, for more than 40 years an engineer with the Allis-Chalmers Manufacturing Co. and one of the world's oldest rock-crushing and cement engineers, died of heart disease October 3 at his home in New Rochelle, New York. Early in his career he joined his father, Addison MacEwen, inventor of the automatic railroad dump car, in organizing a company which built the first car of that type in Jersey City. The company failed before the turn of the century and Mr. MacEwen joined the Allis-Chalmers company, from which he retired four years ago.

They're Sure-fire Cost-cutters



43-ton, 300-hp, diesel-electric locomotive

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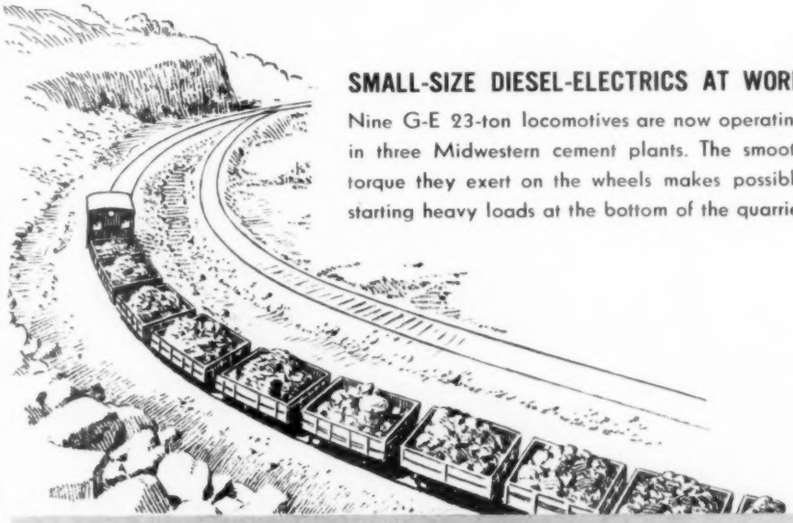
THEY save money in fuel and maintenance costs. They reduce wear on cars and track because they run smoothly. They are easy to handle because of the simple electrical control. They are available for work most of the time. And now you can get them at the lowest prices in diesel-electric history.

General Electric has built a large number of these locomotives in the larger sizes for both railroad and industrial switching work, and the operating data obtained show that in most cases they pay for themselves in a remarkably short time.

Why not investigate the savings possible in hauling or switching work with our small-size diesel-electrics. Call the nearest G-E office and one of our representatives will be glad to talk this over with you. General Electric, Schenectady, N. Y.



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Nine G-E 23-ton locomotives are now operating in three Midwestern cement plants. The smooth torque they exert on the wheels makes possible starting heavy loads at the bottom of the quarries

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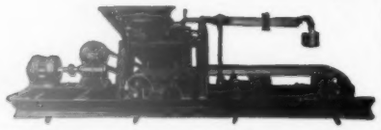

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Labor Decisions

Interstate Commerce

National Labor Relations Board v. Planters Mfg. Co., Inc., decided by the U. S. Circuit Court of Appeals, Fourth Circuit, July 26, 1939; reported at 105 Fed. (2d) 750. In this case the Court accepts the National Labor Relations Board's findings of fact that the respondent company engaged in unfair labor practices, and decrees enforcement of the Board's order for the company to cease interfering with the employees' right of self-organization, and to reinstate with pay certain employees.

The company challenged the jurisdiction of the Board on the ground that it was not engaged in nor that its operations affected interstate commerce. The Court holds that the National Labor Relations Act does apply to the company, because [1] from 2 to 5 per cent. of the raw materials used in the manufacturing operations was shipped from outside the state; [2] from 10 to 20 per cent. of the finished products was shipped to points outside the state; [3] the baskets, hampers, crates, and other containers manufactured and sold by the company within the state are often shipped outside the state when they have been filled with food products; and [4] the company competes in its sales in the state with manufacturers of similar containers whose plants are located in other states.

Wrong Union

National Labor Relations Board v. National Motor Bearing Co., decided by the U. S. Circuit Court of Appeals, Ninth Circuit, June 2, 1939, opinion amended June 15, 1939; reported at 105 Fed. (2d) 652. The respondent company is a manufacturer of automobile parts. Early in 1937 certain organization proceedings were being conducted both by a union affiliated with the A. F. of L. and by a union affiliated with the C.I.O. During these proceedings the company closed the plant without warning (a step construed as a "mass discharge"), stating that it feared a sit-down strike. Afterward it entered into a closed-shop contract with the A. F. of L. union and proceeded to hire or rehire employees. The National Labor Relations Board found that the company's action constituted unfair labor practices and interference with the employees' right of self-organization and that the C.I.O. union in fact was the proper bargaining representative of the employees; and ordered the company to cease interference with the employees' self-organization, not to give effect to its contract with the other union, and to reinstate with back pay certain employees. The Court decrees enforcement of the order with exceptions as to employees who had found employment elsewhere. It also excepts from the order a provision ordering the company to cease "surveillance" of the meetings and activities of any labor organization of its employees; such surveillance, in the view of the court, is not an "unfair labor practice" unless it amounts to "interference," which is prohibited.

Wage and Hour Law

The first court decision on the constitutionality of the Fair Labor Standards Act of 1938, according to the United States Law Week (Vol. 7, p. 323, October 3, 1939) was rendered late in September by the United States District Court for Puerto Rico, holding that the Act is valid. The decision was in a suit for a declaratory judgment, and in holding the statute to be constitutional the Court rejected contentions that the power of Congress over interstate commerce does not extend to regulation of wages and hours of manufacturing concerns, and that the Act is an invasion of the powers reserved by the Tenth Amendment.

Also involved in the case, as summarized by the Law Week, was the provision of the Act exempting employees engaged in the processing of agricultural commodities within the "area of production." The employer, a sugar company, failed in its contention that all its properties are within the area of production; the administrative finding that only those employees engaged in the cultivation or harvesting of sugar cane are exempt was upheld.

It is further reported that another Federal district court is expected to rule on the constitutionality of the Act in the near future; two companies indicted at Jacksonville, Florida, have filed demurrers alleging that the Act is an unconstitutional attempt to exercise the Federal commerce power. A third test of the Act, it is said, may arise out of the order of the Administrator fixing minimum wages for the textile industry (7 U. S. Law Week 268).

The Food Machinery Corporation has acquired the Kimball-Krogh Pump Company, a division of the Victor Equipment Company. Large manufacturers of deep-well pumping equipment through their Peerless Pump Division, Kimball-Krogh will now be merged into another pump manufacturing unit of the Food Machinery Corporation.

Occupational Diseases and the Law

Cement Dust

Traders & General Insurance Company v. Jacques et al., decided by the Court of Civil Appeals of Texas, Austin, July 5, 1939 (rehearing denied July 22, 1939); reported at 131 S.W. (2d) 133. This case was an appeal by an insurance carrier from an award of compensation to a contractor's employee who was disabled by reason of tuberculosis. Among the various grounds for the appeal, the carrier urged that the evidence did not support the finding that the employee's disability (active tuberculosis) resulted from the asserted injury (inhalation of cement dust). The testimony indicated that the injured workman was a foreman for a hauling contractor, and on a certain day, in order to keep the cement trucks moving, he beat upon a cement truck with a hammer to loosen the cement in it; while doing so, he inhaled into his lungs a large quantity of cement dust blown by a sudden gust of wind. This, according to the medical testimony, was the cause of the employee's active tuberculosis which later set in and which disabled him. The award of compensation is affirmed.

Grain Dust

Grain Handling Company, Inc., et al., v. McManigal et al. The United States Supreme Court on October 9, 1939, disposed of this case by denying certiorari which had been sought to review the decision of the United States Circuit Court of Appeals, Second Circuit (reported at 102 Fed. (2d) 464). The case involved a compensation claim for total disability alleged to have been sustained during the course of employment. The Deputy Commissioner, United States Employees' Compensation Commission, awarded compensation, finding that on June 15, 1936, and for 25 years before that the claimant was employed by the company, and that during that time he contracted an occupational disease arising out of the course of his employment as a grain scooper; that the employee had contracted a latent tubercular condition which was in a latent state, and that his employment as a grain scooper required him to work in a thick grain dust, causing the latent tubercular condition to

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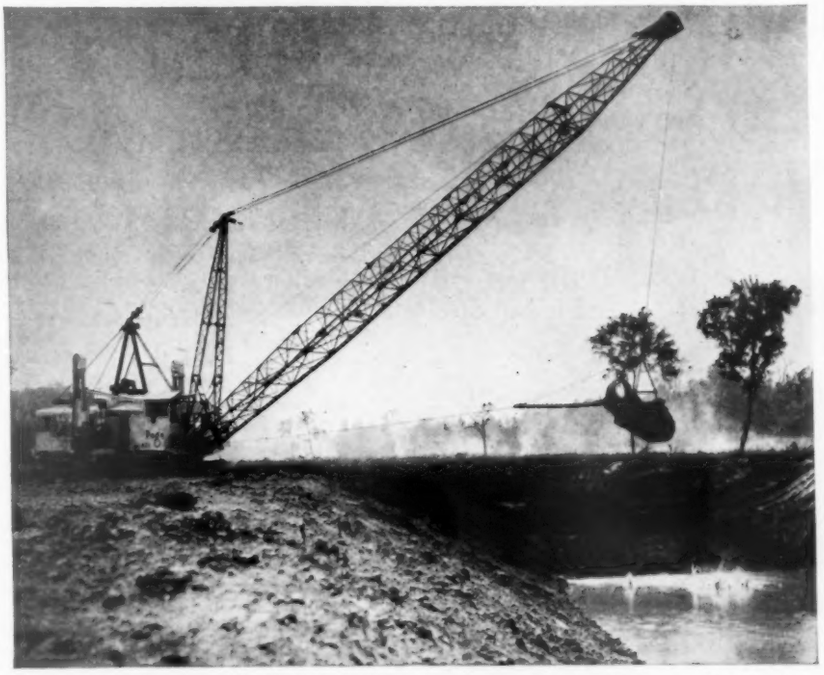

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become active and gradually worse so that it was in an active and disabling state on the day he quit work. The employer's bill to set aside the compensation order was dismissed by the District Court. The Circuit Court of Appeals affirmed the decision, and by denying certiorari the Supreme Court in effect allows the award to stand.

Traffic News Digest

RECENT I. C. C. DECISIONS

Cement. In an investigation and suspension case the Commission has found that proposed rates on cement from Savannah, Ga., to destinations in South Carolina by motor truck were not unreasonably low and would appear to yield revenues somewhat in excess of the cost of operation, yet these proposed rates have been set aside to protect the railroads. In this case O. Alexander Hicklin Motor Truck Line published a mileage scale of cement rates to apply from Savannah to destinations in South Carolina on distances of from 121 to 360 miles. The rate for distances from 121 to 160 miles was 14 cents, to 200 miles, 15 cents, to 220 miles, 16 cents, to 260 miles, 17 cents, to 300 miles, 18 cents, to 340 miles, 19 cents and to 360 miles, 20 cents. At the request of the rail carriers the Commission suspended the proposed rates until May 14, 1939. The case had not been decided by May 14, 1939, and since the respondent refused to postpone the effective date of the tariff it was allowed to go into effect at that time. Before the hearing the truck line had asked the Commission for authority to cancel the proposed rate for distances in excess of 180 miles so that the 15-cent rate would apply on distances of from 161 to 180 miles. The Commission denied such authority. At the hearing the respondent submitted no evidence in defense of the proposed reduced rates for distances of 180 miles and over. This brought the issue down to the lawfulness of the 14 and 15 cent rates applying for distances of from 121 to 160 miles and 161 to 180 miles respectively. These rates are on the same basis as the distance rail rates applicable where specific rates are not provided. Lower commodity rates are published by the rail lines on cement from Savannah to specific points in South Carolina. While the proposed rates were the same as the distance rail rates they applied on a minimum of 20,000 pounds, whereas the minimum for rail shipment was 50,000 pounds. Rail rates were prescribed in Southern Cement Rates, 132 I. C. C. 427 subject to the increases authorized in Ex Parte No. 123. The railroads contended that it was not necessary to have as low a minimum as 20,000 pounds and that they could not furnish cars having a capacity of less than 50,000 pounds. They suggested that the respondent could make the minimum 50,000 pounds by transporting this minimum in three or more of its units; and that there was no demand or necessity for a minimum of 20,000 pounds. The Commission has found these proposed rates in their entirety unlawful and has ordered their cancellation on and before October 20th and has discontinued the proceeding in I. and S. M-538, cement from Savannah, Georgia to South Carolina points.

Crushed Stone, Sand and Gravel. The rate situation on crushed stone, sand and gravel within the Chicago switching district and from points just outside the district into Chicago have been before the Commission almost constantly for the past few years. In order to meet truck and water competition the rail carriers have been authorized to establish and maintain rates on these commodities on a 100,000-pound minimum of 44 cents for a single line haul, 55 cents for a two line haul, 66 cents for a three line haul within the district. These rates apply on a net ton. From Joliet, Illinois to the Chicago-Gary district a single-line rate of not less than 50 cents and a joint rate of not less than 70 cents was authorized by the Commission. All of these rates were to have expired on September 30. The New York Central asked authority to extend these rates until December 31, 1940 or until the further order of the Commission. While the hearing was going on general petitions were filed by the rail carriers proposing to maintain a rate of 50 cents from Joliet, Illinois to the Chicago-Gary district with corresponding reductions in other rates from without the district as permanent rates. In the thirteenth supplemental report to the original case which was docket No. 19,610 the Commission has answered the petition of the New York Central by granting authority to continue the present rates until further order of the Commission. I. C. C. docket No. 19,610 switching rates in Chicago switching district; No. 24,950 Acme Steel Co., *et al. v.* A. T. & S. F. *et al.;* No. 17,817, Chicago Gravel Co. *et al v.* Same; and sub-number No. 1, Neal Gravel Co. *v.* Same.

On further hearings on the subject of rates on crushed stone, sand and gravel from points in Wisconsin, Illinois and Indiana, to destinations in the Chicago-Gary district the Commission has amended prior reports and orders, finding that the competition by truck and water was actual and compelling, has authorized the establishment of proposed reduced rates. In previous reports points of origin were divided into zones I, II and III. The proposed rates are 50 cents for zone I, 55 cents for zone II and 60 cents for zone III. These rates are per net ton and apply for a single line haul with a differential of 20 cents per ton higher for joint hauls. Permission to establish these rates is subject to the condition that the differentials resulting from the rates previously prescribed in one of these cases shall be maintained except where it is indicated there might be departures therefrom. The carriers have been given further permission to reduce rates to a given destination where approved under a cooperative procedure which has been in effect with respect to such rates, and appropriate short notice authority and relief from the long-and-short-haul clause is granted by the Interstate Commerce Commission and the Indiana Public Utilities Commission provided that the origin differentials resulting from the rates prescribed in the original report, including the existing parity between Lehigh, Thornton and other Illinois origins, shall be maintained. I. C. C. docket No. 17,817, Chicago Gravel Co. *et al. v.* A. T. & S. F. *et al.* and cases joined therewith. Also No. 21,894, Lehigh Stone Co. *v.* B. & O. *et al.*

Lime. In response to Fourth section application No. 17,369, carriers have been authorized to establish and maintain rates on common, hydrated, quick or slacked lime from Kingsport, Tennessee and from intermediate points from which the rates from Kingsport will be observed as maxima, to destinations in Kentucky, Ohio, Virginia, and West Virginia, without observing the long-and-short-haul clause of section 4. This relief is subject to the 50- and 70-per cent. circuity limitations with the exception that destination points may be grouped to correspond with the established class rate grouping of such destinations, and

the circuity of the longer routes may be determined by comparison of the distances over such routes, to distances to basing points or centrally located points in such groups, with the corresponding distances over the short lines or routes. Rates to higher rated intermediate points when in southern territory are not to exceed rates constructed on the basis of the distance scale of rates prescribed in "Lime Between Southern Points, 129 I. C. C. 635;" when such intermediate points are in official territory the rates are not to exceed those prescribed in Gager Lime Manufacturing Company *v.* Alton, 218 I. C. C. 857, plus the increases authorized in the Fifteen Per Cent. Case, 1937-1938, 226 I. C. C. 41. Rates from any intermediate producing or shipping point to any destination in the territory involved are not to exceed the rates constructed on the same basis and in the same manner as the rates from Kingsport. I. C. C. F. S. O. No. 13,557, lime from Kingsport, Tennessee.

EXAMINER'S REPORT

Gypsum Lath. The establishment of new gypsum plants in the south, one by National Gypsum Company at Port Wentworth (Savannah), Georgia and one by the United States Gypsum Company at Jacksonville, Florida and the action of the state utilities commission has brought about a problem in connection with the rates on gypsum lath and plaster board. Previously gypsum lath moved as plaster board on the same rate. The Georgia and Florida commissions each established low rates on these commodities for intrastate application so that National Gypsum Company could not successfully compete in Florida or United States Gypsum Company in Georgia. The railroads submitted a proposal to the two state commissions to increase the level of the rates on plaster and plaster board both intrastate and interstate to 17½ per cent. of the first class rate. The Florida commission authorized the increase, but the Georgia commission would not permit rates higher than 15 per cent. of the first class rates on lath. Both states permitted increase in the rates on plaster board to 22½ per cent. of first class which was the basis effective on interstate traffic. Shippers having plants in official western and trunk line territory asked suspension of the proposed rating on gypsum lath of 17½ per cent. of the first-class rates. They did not object to this basis for plaster. The railroads showed at the hearing that the rates on gypsum lath in central and eastern trunk line territories were lower than the suspended rates for like distances. The shippers who asked for suspension objected to the proposed rates on the basis that rates from without southern territory to points within southern territory were made on approximately 22½ per cent. of the southern first class rates. They complained that in order for them to compete in southern territory they would be required to absorb an undue and in fact impossible proportion of the freight charges. In commenting on this contention the examiner said that there would seem to be little doubt but that with the proposed adjustment in effect, the interterritorial shipper would find it more difficult to meet the competition of the southern mills in southern territory, but that it was a question as to whether this would constitute undue prejudice as contemplated in section 3 of the interstate commerce act. On this point he used the following language:

"Certain it is that unless the proposed adjustment will result in violation of section 3, it can be condemned on no other ground. In this connection it is to be observed that the competitive situation in the south that would result from the establishment of the proposed rates would hardly be different from the competitive situation as it now exists in official territory, for in the latter territory the intraterritorial rates are substantially lower

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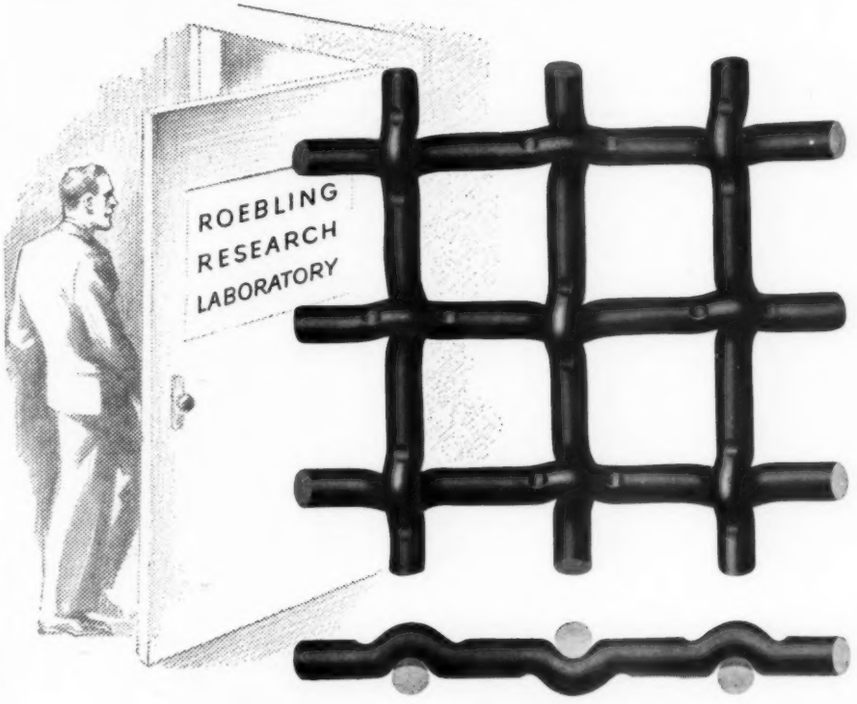

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than the present interterritorial basis. The answer which would probably be made to this is that the companies which have established plants at Port Wentworth and Jacksonville also have plants in official territory, and that, therefore, their southern plants would have no occasion for shipping into the northern area. The respondents herein have little if any control over the rates from interterritorial origins, but they are willing to join with their connections in rates from such origins into the south made on the same level as are the proposed rates, and they urge, therefore, that they can not be charged with unduly prejudicing the shipper from interterritorial origins. Were the proposed rates already in effect, it is clear that an order requiring the removal of any prejudice found to exist could be complied with only in one way, namely, by increasing the rates within the south, and this is quite the contrary of the principle laid down by the Supreme Court in Texas 7 P. Ry. Co. *v.* United States, 289 U. S. 627, where the court said:

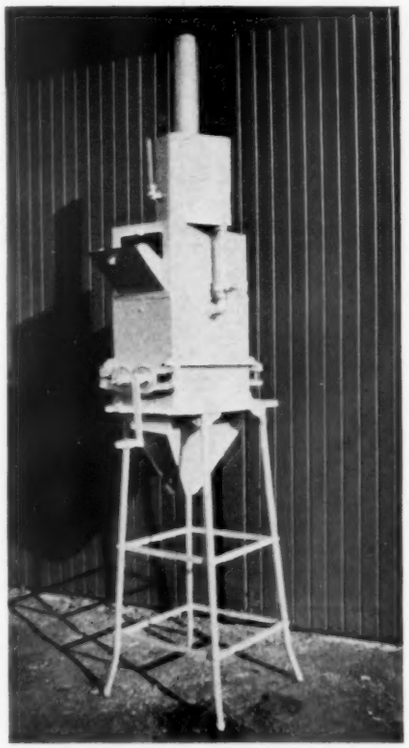
A carrier or group of carriers must be the common source of the discrimination—must effectively participate in both rates, if an order for correction of the disparity is to run against it or them. Where an order is made under Section 3 an alternative must be afforded. The offender or offenders may abate the discrimination by raising one rate, lowering the order, or altering both.

See also City of Philadelphia *v.* Baltimore & O. R. Co., 231 I. C. C. 21. It being beyond the power of the Commission to condemn the rates under section 3 of the act were they already in effect, it follows that the Commission has not the right to prevent the establishment of such rates. See The Ogden Gateway Case, 35 I. C. C. 131,140! The Examiner, H. W. Archer, recommends that the Commission find justified the proposal of the carriers to establish reduced rates on gypsum lath between points in southern territory on the basis of 17½ per cent. of the first class rate currently in effect with a carload minimum of 40,000 pounds applying. This also involves rates via the Mobile & Ohio Transportation Company, a motor carrier. I. C. C. docket I. and S. No. 4,635 and No. 4,636, gypsum lath in the south.

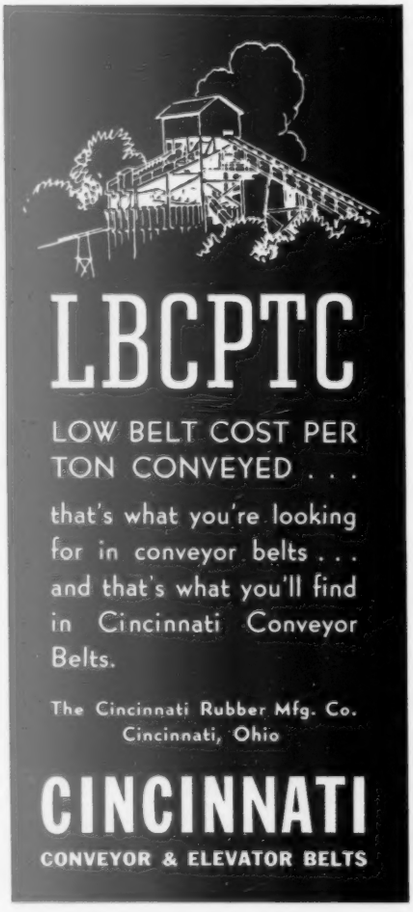
Lime. Rates on lime from points of origin in central territory to destinations in trunk line and New England territories were prescribed by the Commission in 159 I. C. C. 9 and 183 I. C. C. 730. This basis was roughly a 10-per cent. increase in the scale prescribed for rates to points within central territory. Points of origin were grouped and points of destination followed the large groupings in the old McGraham formula. The carriers attempted to adjust some of these rates which were suspended by the Commission and a petition was filed by the carriers asking the Commission to modify its prior findings and orders allowing the carriers to establish rates to smaller destination groups which were authorized in the eastern class rate investigation. Examiner Frank C. Weems in his proposed report says that the Commission should find not justified the schedule suspended in the I. and S. Proceedings, but that the carriers should be given permission to revise the rate structure in accordance with their petition. He said that the McGraham formula is outmoded in view of the Commission as expressed in its report on reconsideration in Midvale Company *v.* W. & L. E., 231 I. C. C. 734. He said that the use of small groups as contemplated by the petitioners will result in rates being based on a structure resting more solidly on the principle of distance as recognized and adopted by the Commission. Shippers in Ohio appeared in favor of the readjustment despite the fact that rates to some destinations to which they have shipped or may ship would be increased. It does not appear that this readjustment would result in any increase in the carriers' revenue. I. C. C. docket No. 19,957, Northwestern Ohio Lime Manufacturers *et al v.* Pennsylvania *et al.* and I. and S. No. 4,346, lime, central territory to the east.

NEW COMPLAINTS FILED

Crushed Stone. An unusual complaint has been filed against a railroad, the Rockton & Rion Railway. According to the complaint this railroad has no right to operate as a common carrier. It is less than five miles long and was formerly owned and operated by the Winnsboro Granite Company as a private carrier. It was proposed to change it to a common carrier and application was made for that purpose in 1932. Other stone shippers filed objections to the application and it was not allowed. In the present complaint the competing shippers alleged that the R. & R. received as a division approximately 40 per cent. of the intrastate rates collected by it. On interstate shipments the R. & R. charged its local rates authorized by South Carolina law on its part of the interstate haul. Complainant alleged that this road is operated without authority as to intrastate as well as interstate to all points beyond Rion, one of its termini. The violations as to the interstate commerce resulting from its failure to obtain a certificate of public convenience and necessity. Shippers on the R. & R. own the railway or are so connected therewith as to bene-



This laboratory test hydrator, for making tests of samples of lime, is a new product of Arnold & Weigel, Incorporated, Woodville, Ohio. The miniature machine is built on the principles of the Weber batch hydrator, and thorough agitation and water distribution are very complete. It will hydrate up to 16-pound batches and can be operated by a motor or provided with a crank for turning by hand. It is readily accessible and has water tank with gage for proportioning water by percentage, has a stack, discharge gate, hopper and is supported on a stand.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fit directly and indirectly from divisions made to the railway to the preference of such shippers and to the prejudice of other shippers create an alleged violation. The complaints allege that the arrangements between this railroad and its interstate connections are in violation of sections 1, 3, 6, 13, of the interstate commerce act, and of the principles of the emergency railroad and transportation act of 1933 in section 205 (2) requiring the Commission in the exercise of its power to prescribe just and reasonable rates to give consideration to the effect of rates on the movement of traffic, etc. The complaint asks that the prescription of through routes and joint rates and an order directing the defendant to cease and desist from transporting in interstate commerce commodities from and to points on the Rockton & Rion Railway. The complaint is filed by Edgar Watkins and Allan Watkins of 1403 Citizens & Southern National Bank Building, Atlanta, Georgia. I. C. C. docket No. 28,332, Weston & Brooker Co., and Palmetto Quarries Co., of Columbia, S. C. *v.* Southern *et al.*

Crushed Stone, Sand and Gravel. The Commission has suspended from September 29, 1939 until April 29, 1940 the operation of schedules published in Supplement 2 to Agent F. D. Miller's Tariff I. C. C. 489 which proposed to reduce the rate on crushed stone, sand and gravel and related articles in carloads for distances of 50 miles and less in southern territory. The present rate for 20 miles is 61 cents and the suspended schedule proposed to reduce this rate to 45 cents a net ton. It is also proposed to reduce the rate for 50 miles from 88 cents to 75 cents and rates for intermediate distances accordingly. I. C. C. I. and S. docket 4,710.

New Machinery and Supplies

• All-Wheel-Drive Trucks

Many engineering improvements and refinements in design are announced by the Marmon-Herrington Company for its 1940 models of All-Wheel-Drive trucks.

In the heavy-duty series of Marmon-Herrington All-Wheel-Drive trucks and trailer tractors there are more than thirty models of four-wheel and six-wheel units powered with Hercules gasoline and diesel engines, each of which is available with standard or special body and operating equipment. These units range in size up to 25-ton load capacity for trucks and up to 50 tons or more for tractors.

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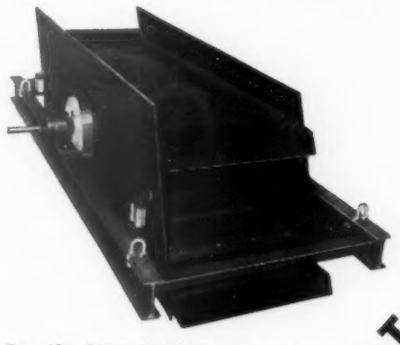

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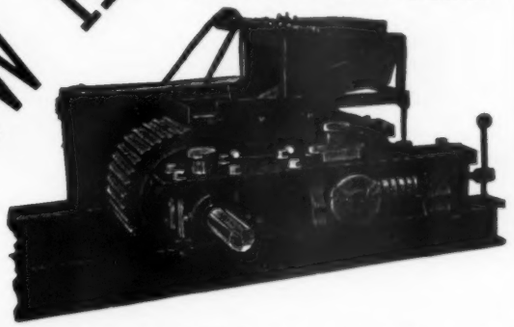

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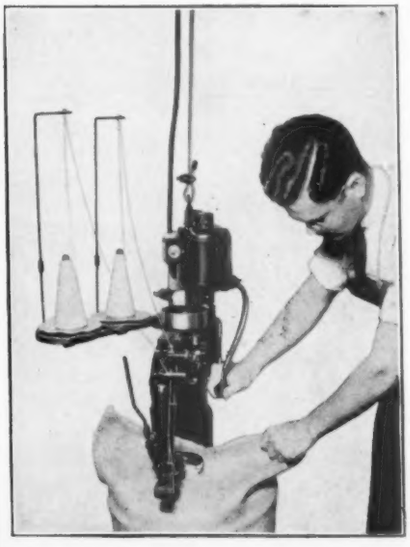
many replacements of parts and chassis alterations which can only be made in Marmon-Herrington plants, under the direct supervision of Marmon-Herrington engineers. Primarily this conversion consists of the replacement of the standard front axle with a driving front axle, front springs by stronger springs, and the addition of an auxiliary transmission, etc. If the vehicle is to be a six-wheeler, the frame is lengthened and strengthened and tandem driving rear axles are installed instead of the standard rear axle.

The general offices and principal manufacturing plant of the Marmon-Herrington Company are located at Indianapolis. Branch offices and distributing agencies have been established throughout the United States and in many foreign countries.

• Bag-Closing Machine

A new suspended-head type bag-closing machine designed specifically for packing rooms where production is small, operation seasonal or part time, and the investment in more elaborate equipment not justified, is now being offered by the Union Special Machine Company, Chicago. The machine is particularly well suited for closing bags in freight cars or other inaccessible places. It is also recommended as auxiliary equipment to take care of peak loads.



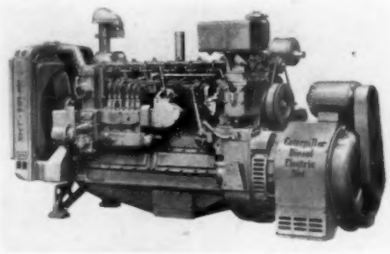
Sewing machine for closing bags.

Basically, the unit consists of a Union Special Class 14500 sewing head suspended from overhead on a pulley and counterbalanced by a suitable weight. A ¼-horsepower driving motor is mounted on the top of the sewing head and actuates the sewing mechanism by means of a friction drive. Wedging-angle contact between the rawhide-faced motor pulley and cast-steel sewing-head pulley is obtained with a finger-tip control lever. Upon release of the driving contact, an automatic brake instantly stops the machine, thus aiding the operator and saving thread. The machine is suitable for closing any size or type of fabric or paper-lined fabric bag. The sewing head is of rugged construction and is especially designed to resist damage by abrasive dust.

• Diesel-Electric Set

To answer a demand for a low cost, economical power plant of 30 kilowatts capacity, the Caterpillar Tractor Company has added to its line of Diesel electric sets by announcing a model 46-30.

The new 30-kilowatt set includes a six-cylinder Diesel engine, and, as in the 15- and



Diesel-powered electric generating set.

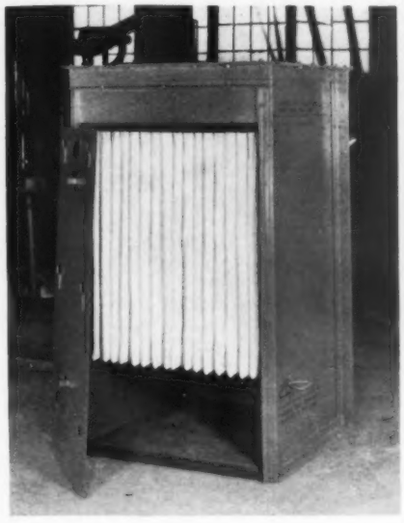
20-kilowatt sizes, has all electrical equipment inbuilt, with the exception of a circuit breaker. Less than an hour is required to install the set and have it providing light and power.

The engine has but three operating adjustments, none of which involves the Diesel fuel system. The generator is of single unit construction, equipped with ball bearings. Built-in regulation enables the set to pick up large motor loads with little light flicker and voltage drop.

No rheostats, switchboards, instruments or complications of any sort are needed with the set. Because units of this capacity are almost always operated close to the power destination, even a voltage regulator is not necessary.

• Dust Filter

The W. W. Sly Manufacturing Company of Cleveland announces a simple, compact, low-priced dust filter, incorporating many features found in their larger equipment—called the Economy Dust Filter. This filter can be



New unit type dust filter.

placed close to individual machines needing exhausting, or used as auxiliary equipment for all types of dust conditions in connection with large dust filters. The flat cloth bags thoroughly cleanse the dust-laden air; they are shaken by hand (handle shown on right side of filter) to remove any clinging dust.

The unit is furnished in four sizes, with a net cloth filtering area ranging from 88 to 352 square feet, handling an air volume from 350 to 1500 cubic feet per minute. The filter is shipped completely assembled and can be used on the floor, mounted against a wall or suspended from overhead.

• Walking Drag-Line

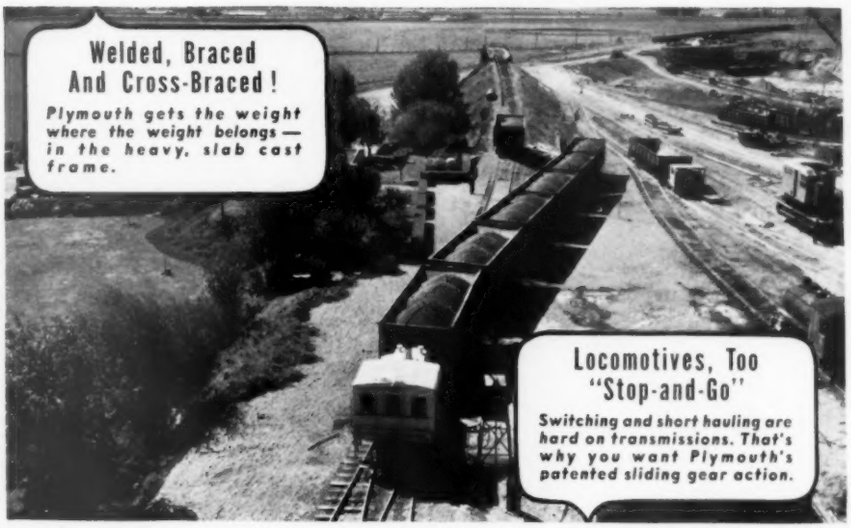
One of the latest contributions to speedy and efficient material handling is the new and modern line of walking drag-lines now being announced by The Marion Steam Shovel Company, Marion, Ohio. The accompanying photo shows a Marion Type 7200 walking drag-line equipped with a 5-cubic yard bucket and a 100-foot boom, which machine is now in service on one of the placer gold mining operations in California.

The walking type machine has some very desirable characteristics for drag-line service, especially on those operations where soft ground may be encountered and where low bearing pressure and extreme mobility are necessary.

When digging the upper frame rests on a large diameter base or tub, the bearing of which is high in comparison with that of the crawlers on the conventional type machines. This results in a low bearing pressure which makes the machine particularly well adapted to dragline work on soft or marshy ground.

One of the especial features of the Marion Walker is that, at the initial stage of the walking step, suction on the tub or base is broken rapidly and the movement of the base is such as to raise it quickly and thus lower the resistance against movement of the material into which the tub may have sunk. This action reduces the stresses to the operating parts during the period of movement which is reflected directly in low maintenance and greater mobility.

The working movement is actuated by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Plymouth gets the weight where the weight belongs — in the heavy, slab cast frame.
Locomotives, Too "Stop-and-Go"
Switching and short hauling are hard on transmissions. That's why you want Plymouth's patented sliding gear action.

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Time after time, users report actual savings—in time, in fuel, in maintenance—after following the recommendations of Plymouth engineers. Let Plymouth study YOUR problem, show you how much you can save. Write, wire or phone . . .

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DIVISION OF THE FATE-ROOT-HEATH CO., PLYMOUTH, O

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Like the combination passer, plunger and punter who plays all over the gridiron, the TRI-VIBE feature of the Leahy Type C No-Blind Vibrating Screen carries the dynamic Leahy differential vibration to all parts of the wire cloth . . . because TRI-VIBE *triple-powers* the free-swinging screen jacket, scoring the greatest advance in modern screen equipment. Result: more yardage in *fine screening*, plus accuracy, uniformity and economy . . . with only ½ HP required. Prepare for extra profits with a new Leahy Type C Vibrating Screen.

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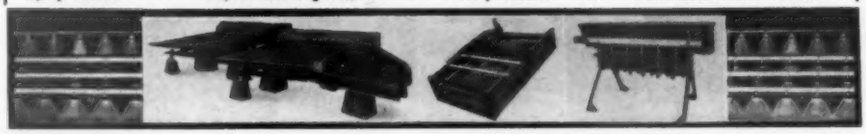

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APPLICATOR BARS
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MANGANAL Applicator Bars enable you to rebuild worn shovel and dipper teeth much cheaper than the cost of buying new ones.

MANGANAL Applicator (Filler) Bars and Welding Electrodes are specially recommended for salvaging old equipment where large amounts of deposited metal are required. Use on heavy duty parts where the going is hardest because of impact and abrasion —on jaw roll and gyratory crushers, bucket lips, R.R. crossing frogs, etc.

Write for Bulletins

STULZ-SICKLES CO.
Newark New Jersey

MANGANAL

Walking drag-line equipped with 5-cubic yard bucket.

cranks, one on each end of a large diameter shaft, which is mounted across the rotating frame and extends outward on each side. Each crank is connected to a walking "shoe" which, when the crank is rotated, makes contact with the ground to support the weight of the machine, while the drag-line moves in the desired direction. This cycle is repeated, the cranks alternately raising the walking shoes, moving them forward until they make contact with the ground and then moving the machine itself.

The latest and most modern designs are incorporated in this new line of Marion walking drag-lines. Adequate strength to meet the digging conditions; fast drag and hoist line speeds; and rapid acceleration and high rotating speeds assure high outputs and low maintenance with maximum profit to users.

These new Marion walking drag-lines are available with bucket sizes from 3 to 12 cubic yards capacity and booms from 80 to 200 feet in length. Power may be either electric or Diesel, at the user's option.

• *Motor Trucks*

Forty important improvements designed for greater overall economy feature the 1940 line of Ford V-8 trucks and commercial cars. With forty-two body and chassis types, six wheelbases and three V-8 engines, it is the broadest line in Ford history. Hydraulic brakes are used on all units.

New in the line is the 158-inch wheelbase chassis available in both conventional and cab-over-engine types. It provides an 84-inch cab-to-axle dimension on the conventional type and a 117-inch cab-to-axle dimension on the cab-over-engine type.

The hood of the regular truck is massive in appearance, its total effect emphasized by perpendicular chrome grille bars and long, horizontal louvres. Simplicity keynotes the new truck-chassis design. Longitudinal front springs like those on Ford cab-over-engine trucks make the engine more accessible from the bottom. At the same time, accessibility of oil gage, air cleaner, spark plugs, fuel pump, carburetor and generator has been increased by lowering the sides of the hood.

Still another change increases the general "under the hood" accessibility. The fan is mounted on the crankshaft in all conventional trucks making it easier to reach the distributor. A lower radiator and single fan belt contribute to ease of servicing.

The new design provides for drive through the springs. This introduces chassis changes which make it much easier to service the clutch, transmission, universal joints and rear axle and facilitates the installation of special equipment. Needle-bearing universal joints are used on all trucks.

Long, flexible front and rear springs with over-size pins provide exceptional cushioning for load. They also give an additional point of support for each frame side rail, which re-

One of the 8-cylinder trucks for 1940.

sults in a decrease in frame stress due to less unsupported length. The front springs are carried on a larger, heavier front axle.

A reduction in chassis weight contributes to operating economy and also leaves more of the gross vehicle weight available for payload.

Considered one of the greatest automotive lighting developments in many years, the new Sealed-Beam headlamps will provide stronger, brighter light for night driving. Reflectors are sealed into the lamps, enabling them to operate with practically undiminished power throughout their life.

A larger battery with capacity increased to 120 ampere hours and a generator with greater output are now standard. A new voltage regulator automatically adjusts the output of the generator to varying electrical loads while a battery condition indicator maintains a constant check of the battery's voltage.

Instruments appear in a new arrangement with temperature gage, fuel gage, oil pressure gage and battery condition indicator grouped around the new Shiftoguide speedometer. The latter is marked so that drivers can tell at a glance when to shift gears for greatest pulling ability and economy.

New rear wheel equipment is available on all regular and cab-over-engine trucks, accommodating tire sizes up to 8.25-20.

• Load Lugger

An improved Model CH Brooks Load Lugger is now in production by the Brooks Equipment and Manufacturing Company of Knoxville, Tennessee. This is an entirely new design, which represents the latest development in detachable-bucket equipment for truck hauling. It is easily mounted on any standard chassis, and offers features that result in faster action, easier control and higher truck efficiency.

Correct load distribution, well forward of the rear axle, eliminates excessive strains on the chassis and enables a 1½-ton truck to carry a fully loaded 2-cubic yard bucket. A unique jackleg device attached to the rear end of the Load Lugger frame relieves the truck chassis of the overhanging load when the bucket is being raised, making counterweights unnecessary. This jackleg adjusts itself to ground level, and is operated from the driver's seat.

The hoisting mechanism is operated by a simple power take-off from the truck engine. The hydraulic hoist is a heavy-duty double-type unit which raises or lowers both bucket-booms at once. Less than 20 seconds is required for raising, dumping or lowering the load. The oil pump and control valve are fully enclosed in a compact unit and mounted under the deck plate, permanently protected.

Simplified control is a feature. The driver handles all operations from the cab, using one lever for controlling the oil valve of the hydraulic hoist and for engaging the dumping hook in discharging the bucket. The bucket is tripped by the dumping hook as it is lowered over the end plate, thus giving higher discharge and quicker spotting of the load. When desired, the loaded bucket can be set back on the ground without dumping.

The Load Lugger buckets are one-piece units, made of heavy steel plate, electrically welded and reinforced. They will hold any material without leakage, including sand or even liquids. They have a capacity of two cubic yards, struck measure, and a height of only 27 inches for easy loading. In carrying position, the bucket rests on the Load Lugger deck between two side plates, being held in place with a pair of double chains, so that it is impossible for the load to shift in any direction, even on the steepest grades that the truck can negotiate. An important advantage of the Model CH Load Lugger is the clear platform space provided by the deck plate. This can be used for hauling miscellaneous materials when the buckets are not in use.

• Controller

New heavy-duty skip-hoist controllers for squirrel-cage motors are announced by the Westinghouse Electric & Manufacturing Company.

The seven controllers in this line cover the entire range of skip-hoist duty, high or slow speed, balanced or unbalanced, single speed or two-speed, and arranged for non-automatic, semi-automatic or automatic operation.

The units consist of contactors and relays mounted on an ebony asbestos base, supported by angle-iron framework or inclosed in a suitable N.E.M.A. Class I or V sheet-steel cabinet. Where dust- or water-tight cabinets are used and equipment is subject to variations of temperature, a small heater is recommended to eliminate condensation.

Overload protection as supplied by a thermal overload relay is the inverse-time limit form. This permits intermittent accelerating and operating peaks which do not harm the motor, but the relay operates on a sustained overload. Either hand or automatic reset may be supplied.

Low-voltage protection, preventing unexpected and unsupervised starting, is provided. Definite time-limit acceleration is secured by a direct-current inductive time-limit relay and a

Simplified control features these improved detachable buckets.

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To LONGER • LIFE

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DIXIE Non-Clog Hammermills take you down the straight road to economy. The vigor of Youth in every detail of construction plus the dependability of veteran service, assure years of trouble - free, *profitable* operation.

The manganese steel moving breaker plate with 26 times the ordinary wearing surface is practically immune to "wear out" troubles. Just *one* of "DIXIE'S" built-in economy features. Wet or sticky materials never clog or slow up a DIXIE on the toughest rocks.

FORTY SIZES—full range of reduction capacities.

For superior year-after-year crushing, travel the DIXIE way — and you "Follow the Leader" to profits.

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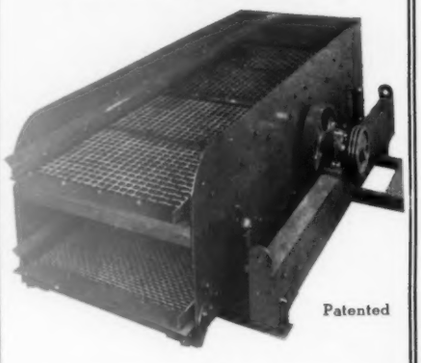

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Six New Special Ammonia Dynamites—These are high stick count powders with strengths from 17% to 48% inclusive.

Two more high stick count powders of Semi-Gelatin type.

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rectox rectifier. Cycle timing through an accurate synchronous motor-driven relay is used for automatic or semi-automatic operation to control the timing period for loading and dumping.

• Roller Chain

A channel-lubricated roller chain, which conforms to American Standard dimensions and is completely interchangeable with all other standard roller chains, has recently been announced by the Morse Chain Company, Ithaca, New York. A particularly ingenious design retains the self-lubricating features of Morse roller chain while adding this complete interchangeability.

Oil applied on the outside surface of the rollers of any roller chain will seep under rollers and lubricate inner roller surfaces turning on the bushings. However, until the introduction by Morse Chain Company several years ago of a roller chain of unique pin and bushing design, the difficulty was in getting oil past the bushing to the core of the joint—the pin.

Channel-lubricated roller chain.

In this round-pin Morse roller chain, diagonal channels are rolled into the stock from which the bushing is formed. When the joint is assembled, these channels appear as spiral grooves and extend through the side plates of the bushing link.

Oil on the rollers quickly finds its way to the bushing surfaces. The channels act not only as reservoirs but as paths for the flow of oil through the side plates and down to the pins, where the lubricant is seized and spread by capillary action in a protective film over the entire contact surfaces of pins and bushings.

Single, double, triple, and quadruple widths, all standard pitches, and standard stock attachments are available in the improved Morse roller chain. Stocks are carried in key cities throughout the country.

Trade Literature

Insley Readymix Receiving Bucket (folder). Insley Manufacturing Corporation, Indianapolis.

Texrope Drives and Lo-Maintenance Motors. 28 pages. Allis-Chalmers Manufacturing Company, Milwaukee.

101 Welding Ideas for Low-Cost Maintenance. 16 pages. Lincoln Electric Company, Cleveland.

Custom Built Automatic Motor Control. 24 pages. Electric Controller & Manufacturing Corporation, Cleveland.

Lubriflush . . . Newest Development in Bearing Lubrication. 4 pages. U. S. Electrical Motors, Inc., Los Angeles.

Superior McCully Crushers. 24 pages. Allis-Chalmers Manufacturing Company, Milwaukee.

Webster Chain Sprockets. 140 pages. Webster Manufacturing, Inc., Tiffin, Ohio.

Peerless Pumps . . . Oil or Water Lubricated. 60 pages. Peerless Pump Division, Food Machinery Corporation, Los Angeles.

Rockwood Pivoted-Motor Drives. 16 pages. Rockwood Manufacturing Company, Indianapolis.

Denver "Sub-A" Flotation. 16 pages. Denver Equipment Company, Denver.

The Vibr-Rite Plain Pallet Stripper. 8 pages. Jackson & Church Company, Saginaw, Michigan.

Habirshaw Asbestos Wires and Cables. 32 pages. Phelps Dodge Copper Products Corporation, New York.

Osgood Model 605 1¼ Yard Excavator. 4 pages. Osgood Company, Marion, Ohio.

Statement of Ownership

Statement of the ownership, management, circulation, etc., required by the Act of Congress of March 3, 1933, of PIT AND QUARRY, published monthly at 538 S. Clark Street, Chicago, Ill., for October 1, 1939.

State of Illinois, County of Cook, ss.

Before me, a notary public in and for the state and county aforesaid, personally appeared H. W. Baumgartner, who, having been duly sworn according to law, deposes and says that he is the business manager of PIT AND QUARRY, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, printed on the reverse side of this form, to-wit:

1. That the names and addresses of the publisher, editor, managing editor, and business manager are:

Publisher, Complete Service Publishing Co.; Editor, S. A. Phillips; Business Manager, H. W. Baumgartner, all of Chicago, Ill.

2. That the owner is Complete Service Publishing Co., Chicago, Ill. That the stockholders owning 1% or more of the total amount of stock are: H. W. Baumgartner, I. A. Baumgartner, S. A. Phillips and Evelyn W. Montgomery, all of Chicago, Ill.

3. That there are no bondholders, mortgagees, or other security holders owning or holding 1% or more of total amount of bonds, mortgages or other securities.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting is given; also that the said two paragraphs contain statement embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest, direct or indirect, in the said stock, bonds, or other securities than as so stated by him.

H. W. BAUMGARTNER,
Business Manager.

Sworn to and subscribed before me this 22nd day of September, 1939.

(Seal)

MICHAEL MOTTO,
Notary Public.

My commission expires Aug. 2, 1941.

The CONCRETE MANUFACTURER

A Special Section of ... ROCK PRODUCTS

MAKE CONCRETE BRICK WITHOUT PALLETS

LEANER MIXES **HIGHER STRENGTHS** **LOWER ABSORPTION**

A process and equipment that has been used for over thirty years in the manufacture of sand lime and concrete brick. The JACKSON & CHURCH brick machines will enable you to produce concrete brick at a cost that will give you a good profit in today's highly competitive markets. Well built, low maintenance cost, high production and simple to operate.

Positively NO PALLETS are used as the brick are taken right from the machine and stacked on to each other on to flat deck cars or racks. They may be cured the same as concrete block, with low pressure steam or moist cured by air. All brick are accurate in size, of smooth texture with clean sharp edges. Cinder, Haydite, Waylite, Superock, Pottsco and other light-weight aggregate brick can be made on these machines.

Colored Concrete Face Brick can be made by adding the color to the mix or the brick may be sprayed after they are made. A large market is opening up in the low cost home field for this type of product. Why not tap this new source of profit by putting in a Jackson & Church Brick Machine in your plant? Let us show you where you can get into a profitable business. Write today for full information.

Model-"A" Brick machine will produce from 3000 to 3500 bricks an hour
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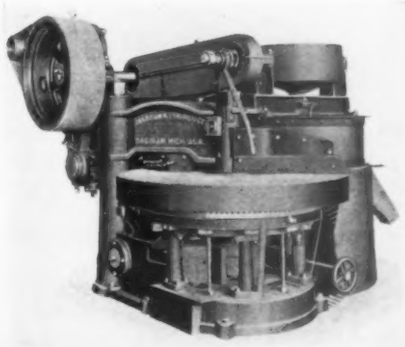

Jackson & Church Company are one of the oldest Brick Machinery manufacturers in the United States, in fact the Sand Lime Brick industry was introduced in this country by this company. Brick machinery and high pressure steam curing equipment were built as far back as 1901, and were installed in the plant of the Saginaw Brick Company in Saginaw, Michigan; the first plant in North America, and from that time on improvements have been made and carried out, so that today Jackson & Church equipment will be found all over the world. The engineering department of this company is at your disposal to assist you in your equipment selection and plant layout.

The VIBR-RITE plain Pallet Stripper concrete block machine made by this company should interest you. A small machine that will produce up to 900 block a day using plain wood or steel pallets for all units. Write for folder today.

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JACKSON & CHURCH CO.

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Complete Line of Concrete Equipment

VIBRATION and TAMP BLOCK MACHINES

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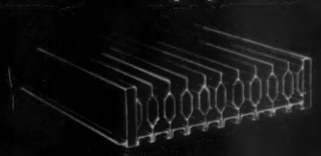

CONCRETE JOIST MACHINES

MATERIAL HANDLING EQUIPMENT

The CONCRETE MANUFACTURER

November, 1939

A SPECIAL SECTION OF PIT AND QUARRY DEVOTED TO PRODUCTION MARKETING AND USES OF CONCRETE PRODUCTS AND READY-MIXED CONCRETE

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End Wisconsin Tests

One of the most intensive and fact-revealing research projects on concrete products ever attempted is being completed at the University of Wisconsin.

The tests, carried out during the past year under the direction of Kurt F. Wendt, assistant professor of mechanical engineering, were made to obtain comparative data on vibrated and tamped concrete block made with various aggregates, both natural and lightweight. The project was conducted through the coöperation of the National Concrete Masonry Association, the American Concrete Institute, leading equipment makers, and aggregates producers.

Official release of the findings is not expected for about 30 days when some interesting, authoritative data on the relative efficiency of tamping versus vibration on the strength, durability and density of concrete units is expected to be revealed, as well as yield per sack of cement, absorption, etc., covering gravel, crushed-stone, cinder, and patented lightweight-aggregate blocks.

Mixing, curing methods, time of curing were under close control throughout the duration of the tests and the freezing-and-thawing cycle was repeated over 100 times to obtain accurate durability data.

Sponsors of the project have cautioned the trade press throughout the course of the tests against revealing prematurely any incomplete or unauthorized findings and the *Concrete Manufacturer* section of PIT AND QUARRY has respected and will continue to respect their wishes in this regard. When the official report is available, readers may expect to find the complete story in PIT AND QUARRY.

■

New Ready-Mix Plant

The Consumers Supply Company of Louisville, achieves a high degree of convenience in the handling of incoming materials, as well as in batching, from its recently installed Blaw-Knox truck-mixer loading plant.

The storage facilities of the plant are provided by a circular bin, 18 feet in diameter. This bin is of the composite type, containing four separate compartments for aggregates and one for cement. Each of the aggregate compartments holds 35 tons while the cement section has a capacity of 300 to 325 barrels.

The aggregates are received by truck, being dumped into a hopper and then raised by an open inclined bucket elevator. This continuous elevator discharges into a turnhead which distributes the aggregates to the separate bin compartments.

Cement is unloaded from hopper bottom cars by a vertical, enclosed type cement elevator. This cement elevator has a rear position in the accompanying illustrations.

The plant feeds batches to a fleet of 2½ cubic yard Blaw-Knox Trukmixers.

The Consumer Supply Company's truck-mixer loading plant.

These are served by a composite aggregate and cement-weighing batcher (of 2½ yard size) which is equipped with a round discharge opening for direct loading of truck mixers; the round nose design eliminates the necessity for using a confining hopper or funnel. The water is provided by an automatic volume-measuring tank, of 125 gallon capacity.

■

Construction Conference

Opportunities for still further accelerating construction as an aid to business recovery will be considered at a National Construction Conference to be held under the auspices of the Chamber of Commerce of the United States at Washington, November 16 and 17.

The purpose of the conference is to point to obstructions checking the flow of private funds into capital expenditures and to suggest means for their removal.

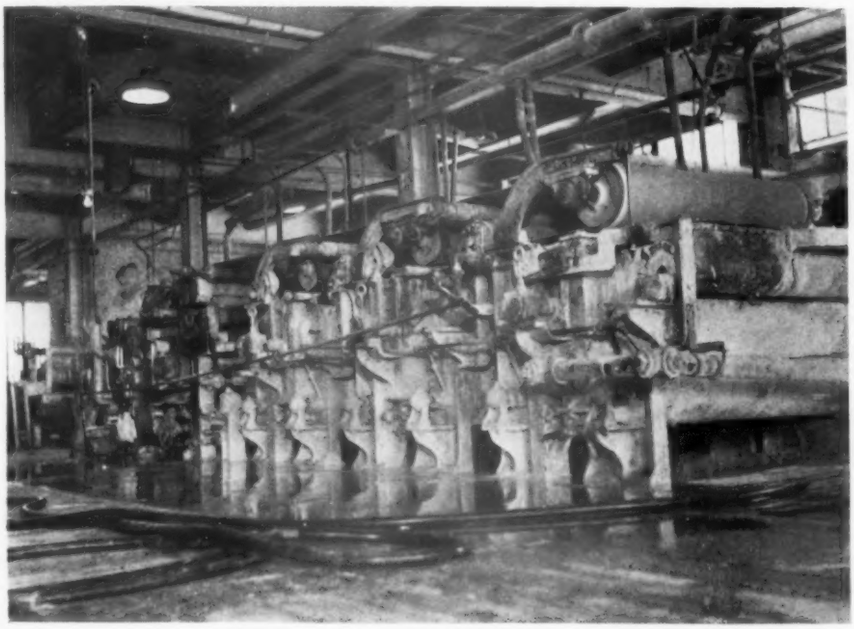
By HARRY F. UTLEY

Close Production Control Maintained in Making Cement-Asbestos Products

THE Flintkote Company manufactures and markets prepared roofing and other building materials on a nation-wide scale. Roll roofings, asphalt and asbestos-cement shingles and sidings are its chief products. The company also offers rock-wool insulation, rigid fiber-board insulation, hardboard products, building papers and felts, asphalt emulsions, paint, plastics and industrial products. Most of these are sold at retail through building-supply dealers.

While asbestos-cement shingles have been on the market for a score or more of years, the use of this material for residing dwellings has advanced rapidly in only the last few years. Property owners faced with the constant and expensive problem of repainting as well as replacing wooden sidings have learned that the application of asbestos-cement over the old material costs little more than does a first-class paint job, that this material never needs a protective coating to preserve its life, that it is fireproof, permanent, and transforms a weatherbeaten, dilapidated house into an attractive, salable structure.

Somewhat identical plants for producing asbestos-cement products are operated by the Flintkote Company at Rutherford, New Jersey, and Chicago Heights, Illinois. At the Chicago Heights plant erected three years ago, which adjoins the asphalt-roofing works, raw materials are stored and mixing takes place on the second floor. Manufacturing is done on the main floor through modern, line-production facilities.



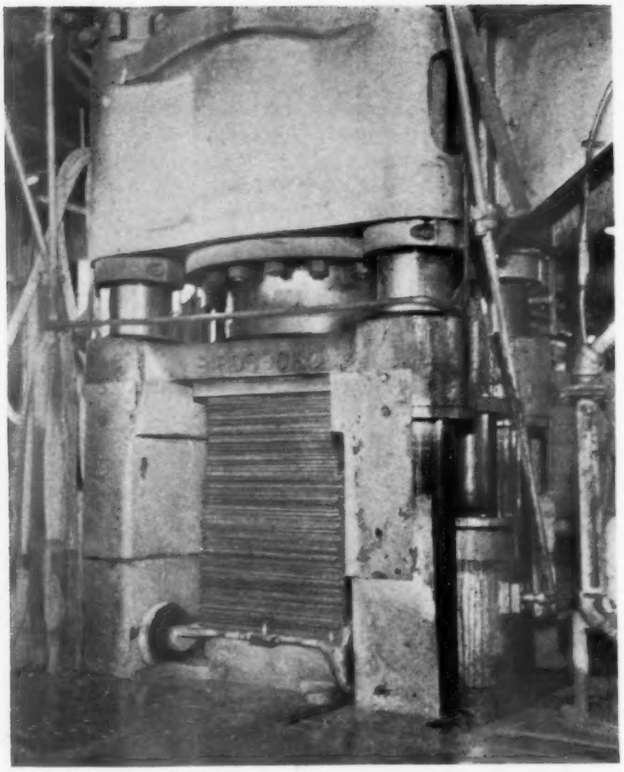
The Hatschek machine which forms the cement-asbestos sheets is similar in appearance and operation to a paper-making machine. The three cylinder molds may be seen at the top.

The ingredients—Portland cement and asbestos—are purchased. The asbestos, medium-fibered chrysotile, is received in burlap bags each containing 100 pounds in box-cars from Quebec. Cement, both gray and white for producing a finished product of like hue, is obtained in paper and cloth bags. An Otis electric elevator carries the bagged material to the second floor where it is handled by a Yale storage-battery electric lift-truck.

Mixing is accomplished in a special mixing beater designed to open up the asbestos and maintain the cement in suspension by means of rapid circulation. The charge of asbestos is first dumped into the beater and thoroughly wetted before the cement is added, thus minimizing the lapse of time from the wetting of the cement to the completion of the process. The mixture is made up of approximately 85 per cent. cement and 15 per cent. asbestos by weight—the volumes being in just about the inverse ratio. Sufficient water is added to make a mixture that will both flow and mix well. After thorough mixing over a controlled period the batch is discharged to an asbestos-cement stock chest located immediately below on the main floor. This chest is constructed

Operator removing a built-up sheet 102 by 52 inches in size from the accumulator roll at the finishing end of the forming machine.

Looking into the mixing beater in which cement, asbestos and water are combined to form the shingle and siding stock.



Hydraulic press which subjects a stack of the product to a pressure of 5,000 pounds per square inch for 5 or 6 minutes.

with a rounded sloping bottom, agitators which prevent any settling out of the cement, and a special delivery-bucket wheel. This delivery-bucket wheel runs in an enlarged section of the chest and carries closely-spaced buckets which discharge into a delivery trough designed to insure a constant rate of discharge from the chest, regardless of the level of the stock in the chest.

The stock is carried from the chest to the Downingtown Hatschek machine which is the heart of the process. This is the type of machine designed in 1900 by the famous Austrian engineer, Hatschek, used in large numbers all over Europe since that day and now brought up-to-date in America.

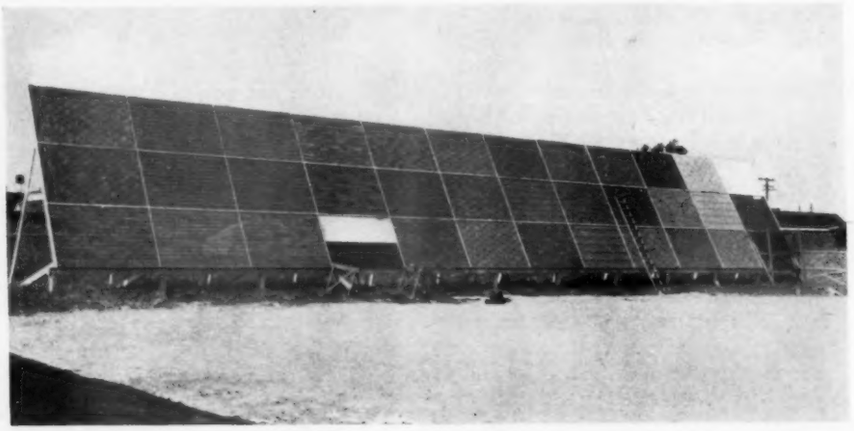
As the material is carried from the stock chest it is diluted and discharged into three special vats equipped with agitators which insure freedom from settling out of the cement. In each vat is mounted a revolving cylinder mold covered with wire cloth. The water passing through the face of the mold deposits a thin, uniform layer of asbestos and cement a few thousandths of an inch thick. This is picked up on an endless blanket of felt which is pressed against the cylinder mold by a rubber-covered couch roll. The blanket travels between a rubber-covered press roll and a special, close-grained-iron accumulator roll on which is built up a sheet approximately 5/16 inch thick. As the felt blanket carrying the wet sheet approaches the accumulator roll it passes over a suction box which dries it sufficiently to insure successful building up of the sheet and at the same time properly join the laminations. After the blanket has deposited the layer of asbestos-cement on the accumulator roll it is showered heavily on both sides, whipped lightly by a revolving whipper and then passes over a suction felt cleaning roll which replaces the convention wringer rolls which are so hard on the felt.

When the material builds up to the desired thickness on the accumulator roll an operator deftly removes it with a special knife and drops the sheet, 102 by 52 inches in size, to a steel slat-conveyor about 5 feet wide and 10 feet between centers, arranged in line with the Downingtown machine.

At this stage of the operations the material is rather soft and can be dented with the fingers. It is semi-dry, most of the water having been removed by the vacuum box in the Hatschek machine. Any imperfect sheets are rejected by an inspector at the slat-conveyor and returned to the mixer.

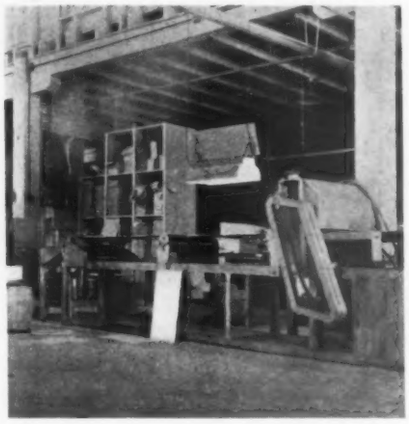
An electric-eye controls the feed of the 102- by 52-inch sheets through a cutting machine equipped with revolving knives which trim the edges and reduce the sheets to eight pieces each 25 inches square. Workmen pile these, without separators, on steel platforms which are moved away from the cutting machine by a Yale lift-truck for re-stacking.

Re-stacking is done preliminary to pressing the squares and is carried out



Weather-testing board, each panel a different product, located on the plant property.

by experienced operators who pile them on special steel 6-wheeled trucks to a height of about 4½ feet. Between the squares of material these operators place alternately smooth steel plates and texture plates. The texture plates impart a simulated wood grain to the face of the product. The stack is then run under a hydraulic press which subjects the pile to a pressure of 5,000 pounds per square inch. The stack remains under pressure for 5 or 6 minutes, compacting the asbestos-cement squares to about half their previous thickness and squeezing out all the remaining water. When the pressure is released the squares have become hard and rigid. Any surplus water is blown off by compressed air and the 25-inch squares are



Inspection belt with fluorescent lamp above.

again piled, back-to-back and face-to-face, on the steel platforms to be carried by lift-trucks to the curing tunnels.

After removal from the curing chambers the 25-inch squares are passed through another cutter, which reduces them to the sizes and shapes in which they are to be used. For siding purposes the pieces are either 12 by 24 inches, 7¾ by 24 inches, or 8 by 16 inches. Weather edges are cut straight, wavy or staggered, depending upon the finished appearance to be achieved when applied to a building. For roofing shingles they are cut into 16-inch squares. Nail holes are punched at the same time the units receive their final trim in the cutting machine.

The trimmed units are placed in racks and waterproofed. They are next passed through a vacuum drier on a Mathews roll-conveyor and carried to the inspection belt. Here trained operators, working under fluorescent mercury-vapor lights which quickly reveal any flaws in the units, sort, grade and package the product. Both shingles and sidings are packed one-third square (33 1/3 square feet when applied) to a bundle; the bundle is bound in cardboard to protect the edges of the units, the binding medium being steel tape applied automatically by an Acme Steel Strapper. The bundles remain inside a room with a uniform temperature of about 60 degrees for from 10 days to two weeks for final seasoning before shipment.

The Chicago Heights plant is operating on a 24-hour three-shift basis. Shipments are made by railroad and motor truck.

Binding bundles of finished units before shipment.

Install Recuperators in Six Cement Plants

The Manitowoc Engineering Works, Manitowoc, Wisconsin, reports that it recently has installed six Vanderwerp recuperators in the following plants:

Four Type F recuperators in the Medusa Portland Cement Company, Bay Bridge, Ohio, plant.

One Type F recuperator in the Medusa Portland Cement Company, York, Pennsylvania, plant.

One Type I recuperator for Cia. Brasilevia di Cimento Portland, S. A., Brazil.

A third aging tank has just been added to the Brooks-Taylor lime-putty plant operated by the Louisville Lime Mortar Company at Louisville. Capacity is increased 50 per cent. inasmuch as it gives the company two tanks from which to draw while the third is aging.

More Concrete-Pouring Records Made at Dam

The speed at which work is going forward on the largest concrete dam in the world—Grand Coulee—continues to break all world records, Harry W. Bashore, acting commissioner, Bureau of Reclamation, reported recently to Secretary of the Interior Harold L. Ickes.

Three records fell in August, Mr. Bashore reported, two on mass-concrete pouring in the dam and one on unloading cars of cement arriving at the dam site.

During the month 397,994 cubic yards or 800,000 tons of concrete were placed in the dam. The total exceeded the previous record by more than 2,000 cubic yards or 4,000 tons despite the fact that during 5 days of August no concrete was poured.

The 10-day record for concrete placing also fell, and by a wider margin. The amount placed during the last 10 days of August totaled 159,042 cubic yards or over 300,000 tons, compared with the previous high of 155,695 cubic yards.

And on August 27, a new unloading record of 81 carloads of cement was established. The highest number previously unloaded in a single day was 79.

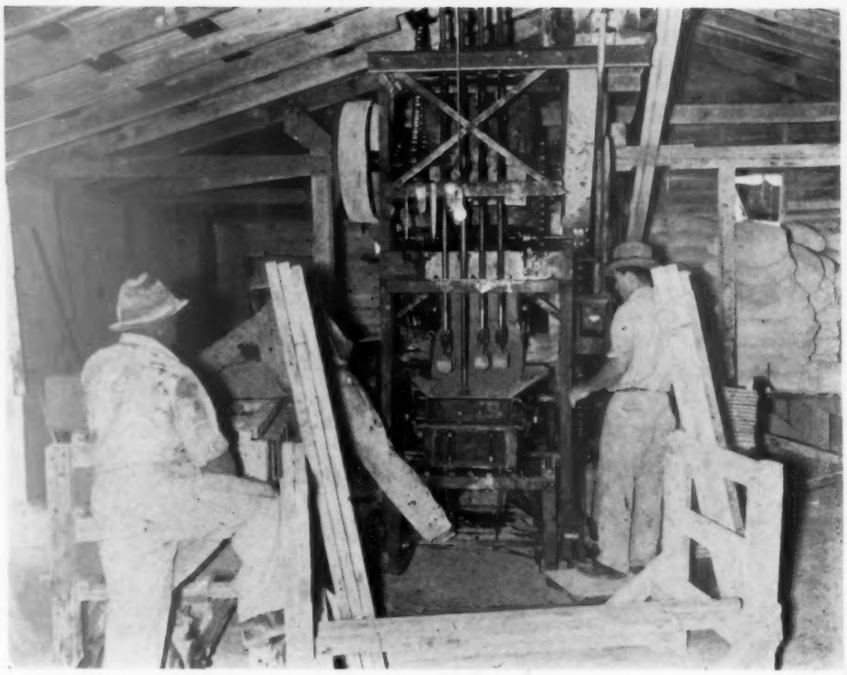
Fire of unknown origin swept through the main plant of the Fort Dodge Gypsum Products Company plant at Fort Dodge, Iowa, recently, causing damage estimated at $30,000.

Firemen were handicapped by an inadequate water supply and the flames spread rapidly through the building.

Recent Installations of Equipment

Four Chain-Belt Rex truck-mixers are serving the new ready-mixed-concrete plant of the Central States Construction Company at La Crosse, Wisconsin, while two truck-mixers of the same type are operating at another new plant, that of the Concrete Ready Mixed Company at La Fayette, Indiana * * * *A Miles power-operated block machine and a Blystone mixer have been installed at the new concrete-products plant of the Schrader Dredging Company, San Pierre, Indiana* * * * A New Holland roll-crusher has been placed in service crushing cinders at the concrete-block plant of the National Cement Products Company, Toledo.

Stearns Joltcrete concrete-block machines have just been installed by George W. Katterjohn & Son, Paducah, Kentucky; Concrete Products Company, Dubuque, Iowa; Hudson Supply & Equipment Company, Washington, D. C.; Reimers-Kaufman Company, Lincoln, Nebraska; Cement Products Company, Savannah, Georgia; Nassau Concrete Products Company, Baldwin, New York; Standard Concrete Products Company, York, Pennsylvania; C. F. Lytle Company, Sioux City, Iowa, and the Acker Cement Products Company, Fort Wayne, Indiana.



One of the twelve tampers used in the plant.

Florida Plant Produces 7,000,000 Blocks, Plus Many "Specials," Yearly

TO those who have known him over a period of many years, Evert P. Maule, general manager and part owner of the Maule Industries, Miami Beach, Florida, is a personification of the spirit which has made American industry what it is to-day. Beginning on a small scale as a crushed-stone producer many years ago, Mr. Maule has expanded his activities into many other related fields until to-day he heads an organization which probably does not have its counterpart in this country. Most of this expansion, incidentally, was done at a time when most other producers were "sitting tight" waiting to see which way the wind would blow.

The aggregates plant at Ojus, 10 miles north of Miami, was the foundation of this business and was enlarged and improved from time to time. It was recently replaced by a new floating crushing-and-screening plant, which is supplied by a floating dipper dredge. The capacity of this equipment is well over 150 cubic yards per hour of sand and gravel. A new crushed-rock plant has also been built a few miles west of Ojus.

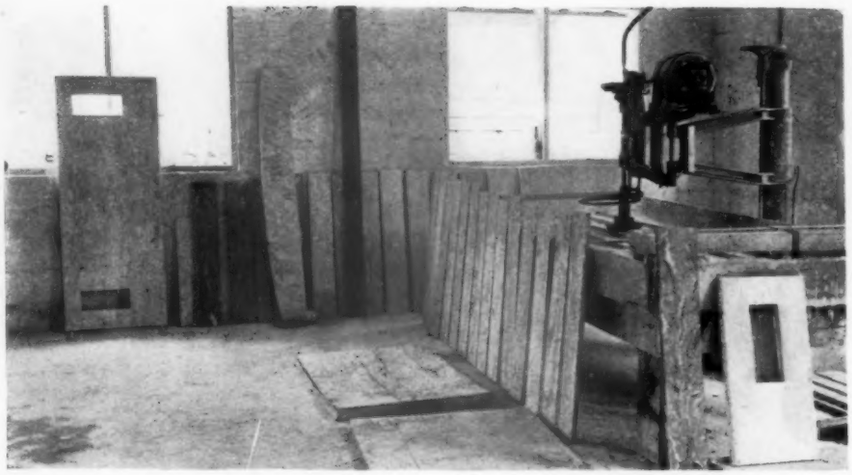
Lime rock being unloaded from cars to larries which serve the mixers.

Close-up view of blocks in a rack showing hand holds and identifying marks.

The manufacture of concrete blocks was next begun on a small scale and this business had a phenomenal growth. At the yard at Ojus there are now 8 block machines turning out regular blocks and 4 others which can be used either for regular blocks or for "specials." Still another machine makes extra-large blocks. Many special products are also made by hand and a large demand for floor and wall tiles and other special products has been developed. The magnitude of this business may be realized from the fact that the company's annual sales in recent years comprised over 5,000,000 regular blocks and 2,000,000 blocks of other types. This is said to be nearly three-fourths of the total number of blocks used in this area, which is served by at least seven other producers.

The ready-mixed-concrete business was a comparatively recent addition to the list. The company's first batching plant was built in 1935 at its Miami Beach yard with five Blaw-Knox 1½-cubic yard truck-mixers. Now the company also has batching plants in Miami, Ojus and Fort Lauderdale, and operates a fleet of 23 truck-mixers.

There follows a brief summary of the other industries included in the company name of Maule Industries. Because of the rapidity with which things develop in this organization, however, the writer can not guarantee this to be a complete list, as other products may have been added since these operations were visited several months ago. At its Miami Beach yard, in addition to ready-mixed concrete and building materials, the company also has a steel-fabricating plant, where reinforcing steel and cages are shaped for use in concrete



Marble-finishing machine and some of the finished slabs.

construction and piling. At Ojus, in addition to its concrete-products facilities with which this article will deal more fully, the company also operates an aggregate-bituminizing plant and a complete foundry equipped with an iron cupola, brass furnace, etc. A complete machine and repair shop is also operated. The company makes much of its own equipment and rebuilds other equipment to fit its needs. Most of the concrete-block machines used were made in these shops.

The office and yard at Ojus front on the north-bound lane of U. S. Highway Number 1, the main road from Miami to the north. A filling station was opened some years ago at the office and this was so successful that another was recently opened across the highway to

Workmen finishing some of the marble tiles.

serve the south-bound traffic. A modern lunchroom and restaurant has also been opened and the writer can attest to the quality of the food and cooking. Sea-food dinners are a specialty.

The company has been making specialties of various kinds for many years and has always been quick to add to its line any product for which a demand might be created. In 1938 the company began to manufacture "Terrastone," a facing tile which simulates the Quarry Key Stone from the Florida Keys, which is widely used in this area for ornamental stone. This is cast by hand in wooden molds. Fine Ojus rock is first sprinkled in the bottom of the mold and concrete is poured on the top of the stone. After hardening for from 36 to 48 hours the surface is ground down on a steel wheel with sand and water by the same method commonly used for dimension stone. The finished product is difficult to distinguish from the genuine key stone and is much less expensive.

One of the latest additions to the list of products and one that is rapidly gaining in favor is "Marbacite" tile and wainscoting. It is made by a process which has been used in Europe for many years and was developed by Florus Bierling of Zürich, Switzerland. This product can hardly be distinquished from the natural marbles which it simulates and can be made in any size, shape or thickness. It also is made in wooden molds. Keene's cement with added coloring is first poured into the mold to a depth of ¼ inch. This is allowed to harden for 1 hour before the back-up layer of Keene's cement and sand is poured. After they have hardened these products are then sanded and finished by hand. Marbacite floor tiles are made in the same manner except that Portland cement is used. These tiles are finished on the marble grinder.

Spanish-style floor tiles are also made face down with Portland cement. Three imported Lachave Fils tile ma-

Pedro Rabull, in charge of the manufacture of simulated marble, with some of his products.

chines make these under 1,200-pound pressure in sizes from 8-inch by 8-inch to 12-inch by 12-inch. These tiles are finished in the machine.

All these products have met with immediate success and have been used in such outstanding structures as the new Essex House hotel in Miami Beach and the Modern Veterinary Clinic, a model animal hospital which is located on 79th Street near the Causeway in Miami. Several officers of the company recently built new houses in which Marbacite was used for floors, wall panels, window sills, fireplaces, etc.

A load of blocks being transferred to outdoor storage.

"Ornamentals" and "specials" stored in the yard.

Terrastone was used for steps, terraces, porches, flagstones, fireplaces, etc., wherever quarry key stone is ordinarily used.

About a year ago a machine was built to make concrete shingles. Pressed-steel pallets are used to make these shingles, which are ⅝ inch thick, 8 inches wide and 16 inches long with two nail holes at one end. These have been made in grey with Portland cement and in white with white cement.

The company has also just started to make concrete window frames in wooden forms and a complete line of structural and decorative cast stone. Miscellaneous ornamental products too numerous to mention are made in various sizes and colors. Included are flower pots, ornamental cast-concrete vents, garden seats, bird baths, etc. The flower pots are made on a special machine and are in great demand. Other products are septic tanks, precast-concrete drive-way markers, etc. Some culvert pipe is also made.

Unusual precautions are taken to insure high quality and to make possible the tracing of any defective product to its source. Each machine has a private mark which identifies any block coming from it. When piled in the yard the date of manufacture is painted on the end block in each section. The Nutting Laboratory in Miami, which supervises the making of all the company's products, runs a constant series of tests to check the quality of these blocks. From a chart of block markings entries are made on the test sheets and any defective block can be easily traced.

A yard man inspects each truck-load of blocks leaving the yard and marks the date of manufacture and the number of the trucks on two blocks in each load. If any complaints are received on the condition of the blocks on their arrival at the job, it is easy by this system to check the records to see if they have been mishandled by the driver in loading or unloading. These records also make it possible to trace any defective block back to the machine on which it was made and to the men who operated it. The psychological effect of this system on the company's employees when it was adopted was a considerable improvement in the appearance, quality and delivered condition of the blocks.

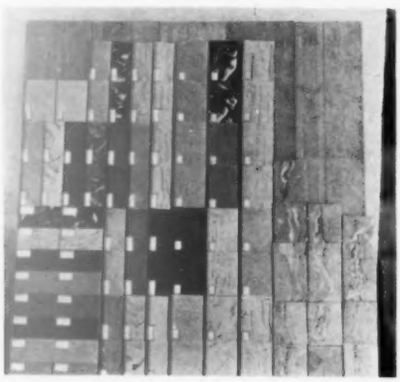
The regular blocks meet all specifications and average over 1,000 p.s.i. compressive strength. Standard 8-inch by 8-inch by 16-inch blocks sell for 7½ cents each at the plant and 8½ cents each delivered anywhere in the Greater Miami Area and within a radius of 25 miles. These low prices make it possible to build a concrete-block house for only 15 per cent. more than the cost of an all-wood-frame house.

The concrete blocks are made in a number of plants located in various parts of the yard, each plant having its own storage space. Each plant has one or more machines and each machine has its own weigh-larry for aggregates, mixer, conveyor, etc. All the products are carried to storage on Barrett-Cravens lift trucks. There is out-of-doors storage space for half a million blocks.

All the ordinary blocks are made with special hand holds on their ends, a feature which has made them very popular with masons.

Eight machines are ordinarily used to manufacture standard 8- by 8- by 16-inch blocks and these have a combined capacity of 18,000 blocks in a 10-hour day. Four other machines are used for round-corner blocks, partition tiles, etc. Another machine makes 8- by 12- by 16-inch blocks at the rate of 1,000 daily. Three machines are used for making concrete bricks, which have corner holes and are used chiefly for fill-in-work. Some solid bricks are also made for veneer work.

Exhibit of products at plant-office entrance.



Various colors and types of marbles labeled for identification.

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Made in any length or diameter with either Tongue and Groove, Bell and Spigot or Plain Ends.

Medium, Heavy and Extra Heavy Duty Forms for Sewers and Culverts, Well Casing, Drainage, Septic Tanks, etc.

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For more than 35 years makers of dependable concrete pipe molds and pipe machines.

LEFT — Some of the pipes being loaded and a view of the larger units stored in the yard. BELOW — The packer-head pipe machine.

Portability, Plus Diesel Power, Keeps Pipe-Making Cost Down

ONE way to whip concrete-pipe transportation costs is to "bring the mountain to Mohammed." That is what the Nelson Concrete Culvert Company is doing at Harrisburg, Illinois.

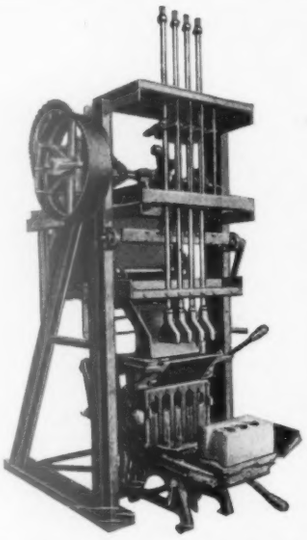
The Nelson concern, which operates permanent plants at East St. Louis and Champaign, won the contract to supply concrete pipe for a W.P.A. project —the laying of an extensive system of storm and sanitary sewers in Harrisburg. In accordance with a plan instituted some time ago by the Concrete Pipe Machinery Company of Sioux City, Iowa, arrangements were made to have a complete, portable pipe plant moved to Harrisburg from the factory at Sioux City. This pipe machine and its auxiliary equipment are similar to those operating in the Nelson company's permanent plants, being a Model T 121 of the dual packer-head type. Extremely compact, the entire mechanism is mounted on a heavy-duty, two-wheeled trailer. An old shop building formerly used by the Southern Illinois Railway & Power Company on the outskirts of Harrisburg was obtained and the plant backed into position in a pit in the concrete floor where it operates.

The portable unit which makes pipes up to 36 inches in diameter is not sold domestically, but is leased on a fee basis, the manufacturer being compensated on the amount of tonnage sold. It is available only to concerns using the dual packer-head machine in their fixed plants. The fee paid for its use is said to be well under the cost of transportation of the pipe, were they made at the contractor's permanent plant, and is in direct relation to the distance away from it. The portable unit is transported to location by the Concrete Pipe Machinery Company, accompanied by a factory-trained attendant who works under the supervision of the lessee.

On location at Harrisburg, the pipe plant includes besides the machine itself, (1) forms for making units up to 36 inches in diameter, (2) a 30-cubic foot mixer, (3) volumetric batcher wheelbarrows and (4) reinforcing-cage fabricating tools, including bending rolls and a welder.

Ordinarily a 50-horsepower motor for the pipe machine and a 20-horsepower motor to drive the mixer are also included, but at the Harrisburg installation power is supplied, reliably and at low cost, by an 85-horsepower, 6-cyl-

The 85-horsepower Diesel engine, with pipe machine in background.



Recognized Everywhere

The Hobbs Jr. Face-Down Block Machine is recognized everywhere as the great general purpose machine of the concrete-products industry. Famous for its wide range of sizes and the variety of blocks it can produce. As illustrated, it is equipped with striking and finishing device, shown under the floor-type tamper and with power feeder.

Hobbs block machines, Anchor tampers, Anchor Jr. strippers, Stearns power strippers and Jolterete, Stearns mixers, and Cast Iron and Press Steel pallets, Straublox oscillating attachments, etc. Repair parts for: Anchor, Ideal, Universal, Stearns, Blystone mixers and many others

ANCHOR CONCRETE MACHINERY CO.
G. M. Friel, Manager — Columbus, Ohio

VIBRATION
—combined with
Pressing Makes the Best Blocks

Here's the Machine That Does It

KENT MACHINE CO.
Cuyahoga Falls, Ohio

inder Cummins Diesel engine. The Diesel engine transmits its power through a V-belt drive. When the plant is in transit the belt drives of the skip bucket, mixer, and the conveyor belt from the mixer to the machine hopper are dropped. This gives ample

Dumping a load of aggregates into the charging hopper.

room for the engine to slide on its I-beam mounting across the frame of the machine proper.

Aggregates and cement are purchased and delivered to the plant site by motor trucks. The volumetric

Volumetric wheelbarrow which measures and delivers the dry ingredients.

batcher wheelbarrows, equipped with pneumatic tires, accurately measure the ingredients and transport them to the skip loader. The concrete mixture used is quite dry, consisting of 12 cubic feet of crushed stone, an equal amount of sand, 5 bags of cement, and only 3½ gallons of water. The skip lifts the ingredients about 9 feet to the mixer and, after thorough mixing, the concrete is fed to the machine hopper by a belt conveyor.

The pipe forms are two half-shells which fit together beneath the machine. A revolving packer-head inside packs the concrete densely, rising from the bottom to the top. The inner walls of the pipes are rolled extremely smooth and to a fine degree of accuracy. After a pipe section is completed the forms are taken off the machine and wheeled with a hand-truck to a section of the building where the forms are removed and the pipes are allowed to "set" for a couple of days, being sprayed at frequent intervals. Later they are removed to yard storage where the spraying process is continued until curing is complete. They are then released to the W.P.A. and are transported to the job by motor trucks.

The unit has been in service at Harrisburg since the middle of April of this year and operates about 6½ hours daily. The Cummins Diesel engine, which runs at 1,800 r.p.m., burns a little over two gallons of 9-cent fuel oil per hour. Not only does it operate for about half the power cost of electrically-driven units, but it makes the unit really portable and able to operate at any site far from power lines.

The Harrisburg operations are being carried out under the supervision of C. S. Ward, vice-president of the Nelson Concrete Culvert Company.

Private Construction Makes Important Gain

Increased private construction contracts awarded last month more than offset a moderate decline in contracts for publicly-owned projects, according to F. W. Dodge Corporation. In consequence, the over-all September contract total for the 37 eastern states, $323,227,000, showed a 3 per cent. increase over the preceding month and a 7 per cent. gain over September, 1938.

The increase of private-ownership contracts from $153,869,000 in August to $179.011,000 in September was principally due to increased volume of commercial and factory building, residential contracts continuing at approximately the August rate. Factory building contracts in September were practically double the amounts awarded in September of last year and in August of this year, the increased activity in this class occurring principally in Ohio and Texas. The September contract total for factory building was the largest recorded since December 1937.

Thus, the trends in evidence during the past several months, of continuing private construction at a relatively high rate and moderately declining public work, persisted during the first month which has elapsed since the outbreak of war in Europe. The cumulative contract total for the first nine months of this year, amounting to $2,634,802,000 is the highest for any like period since 1930, and is 23 per cent. greater than the total for the first nine months of last year. On the basis of this year's record to date, the industry's expectation that 1939 would be the sixth consecutive year of construction volume increase is being realized.

The CONCRETE MANUFACTURER

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Every plant, every producer, every buying factor in the cement, crushed stone, sand and gravel, lime, gypsum and allied industries, will receive a copy of January PIT AND QUARRY—giving 100% coverage in the field.

CONVENTION DISTRIBUTION

January PIT AND QUARRY, in addition to our regular circulation, will be distributed to the attendants of the conventions of the crushed stone, sand and gravel, ready-mixed concrete producers, and Road Show—when equipment purchasers are in a buying mood.

ANNUAL REVIEW NUMBER

January PIT AND QUARRY will contain a complete résumé of the past year's developments in methods, machines and materials—a wealth of valuable data for producers, engineers and purchasing agents.

NEW EQUIPMENT SECTION

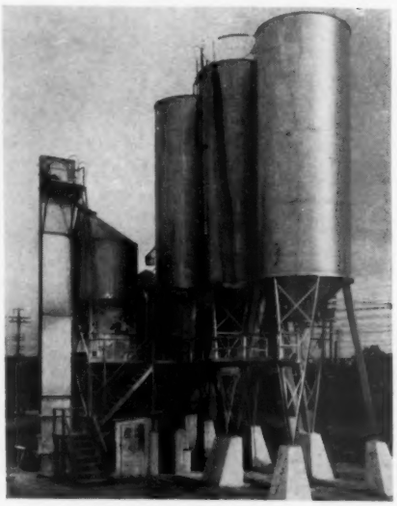
A large section of January PIT AND QUARRY will be devoted to descriptions and illustrations of new equipment—a parade of mechanical progress—up-to-date information that every progressive operator will want to have.

This giant issue will be a reference number from cover to cover—a Yearbook with an "advertising life" far longer than that of any other issue—an advertising opportunity which you can not afford to miss.

PIT AND QUARRY 907 Rand McNally Bldg., CHICAGO

The CONCRETE MANUFACTURER

Increase Capacity of Another BROOKS-TAYLOR Putty Plant



Less than a year after the Louisville Lime Mortar Company placed its aged lime putty plant in operation, the capacity was increased by adding another tank. Plants at New York, New Orleans and Indianapolis have also increased their capacity.

Why not install one of these compact units for producing aged lime putty and supply your customers with lime mortar, stucco and plaster? Write our nearest office or to the Brooks-Taylor Company, Birmingham, Ala., for full information.

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Plants at BIRMINGHAM, CHICAGO & GREENVILLE, PA.

"I'm probably the youngest shovel operator that ever swung a dipper stick—but already PIT AND QUARRY is my favorite magazine."

MILL HAMMERS
CRUSHER TEETH
CONVEYOR SCREWS
GUDGEONS and
BEARINGS—

In fact, ALL parts subject to abrasion *will last three or four times as long* when hard-faced with

COLMONOY

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THERE MUST BE A REASON

FOR

CONTINUED POPULARITY

For nearly nine years Pit and Quarry has led all other papers in this field in subscriptions among producers. It is the most popular paper—with its popularity constantly growing, as is shown by the increasing number of subscriptions and the increasing margin of lead.

The reason? At no time has Pit and Quarry compromised with its high editorial standards. It has held its editorial staff, and kept its field editor on the road, wearing out a car in one to two years. The illustrations have always been plentiful, the articles easy to read.

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We Produce .....

FAMOUS

as its name...

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Travelers acclaim the fine food in the two modern restaurants – the Steamboat Cabin Coffee Shop and the Old English Tap Room – they praise the friendly atmosphere and fine service – and they never forget the modern rooms and the IDEAL LOCATION of the Mark Twain.

300 ROOMS

from $2

O. E. TRONNES, MGR.

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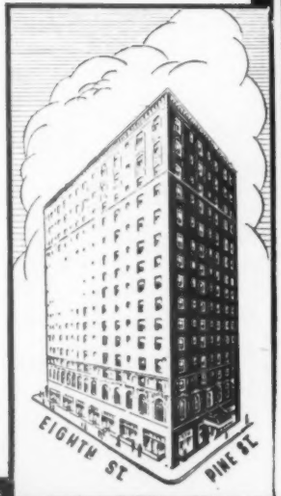

ONE OF THE ALBERT PICK HOTELS

Only Jaeger Truck Mixers Give You These Features...

- DUAL-MIX ACTION produces higher strength concrete— as proved by the Hollister Tests !
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- COR-TEN STEEL — lighter, stronger, resists both rust and abrasion !

Send for new catalog showing why Jaeger Truck Mixers far outsell all others.

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"COMMERCIAL"

CORED *Steel* PALLETS

Will not crack or break.

Light in weight, less than plain pallets

Can be used on Low Cost Machines.

Permit uniform and quick curing.

Makes sharp edges and deep mortar grooves.

No weak places or core bar marks.

Better Ashlar and Header block production.

Close fit to core box.

Write us or your machinery maker.

The COMMERCIAL SHEARING & STAMPING COMPANY

YOUNGSTOWN, OHIO.

Another Progressive Bulk Product Firm "Goes More Modern" via Marietta

For These Sound Reasons — They Installed Marietta Concrete Bins —

- TO STEP UP EFFICIENCY
- LOWER HANDLING COST
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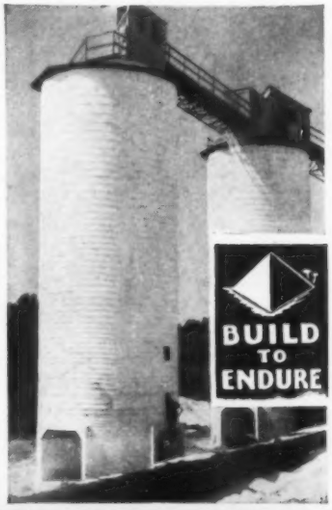
- STOP MATERIAL WASTE

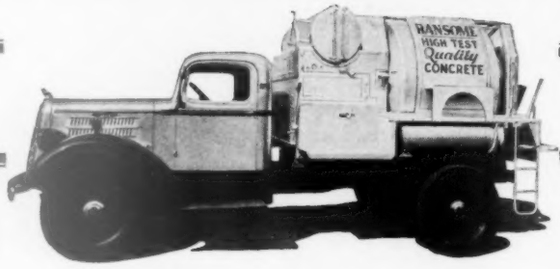
These two Marietta Concrete Storage Bins — recently installed for Central Silica Company, Glass Rock, Ohio — store silica sand. Haydite staves used, for maximum thermal insulation. Tunnels at box car floor level permit car loader's easy movement from bin to bin . . . Built-to-Endure to owners' SPECIAL needs. Meeting definite SAVINGS objectives, are bound to "lift" PROFITS too . . . Let's discuss YOUR storage problem. Our Engineers await your invitation. No obligation.

THE MARIETTA CONCRETE CORPORATION
Marietta, Ohio
Baltimore, Md., Scotia, N.Y.



MARIETTA CONCRETE STORAGE SYSTEMS

KEEP YOUR AND MAKE MORE PROFITS



The Low Operating and Upkeep Costs

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RANSOME America's first & finest MIXER

TRUCK MIXERS & AGITATORS
furnish
a new way to overcome competition by enabling you to deliver a better mixed maximum strength, higher quality concrete at the lowest possible cost.
Write for the facts.

RANSOME CONCRETE MACHINERY CO.
DUNELLEN NEW JERSEY

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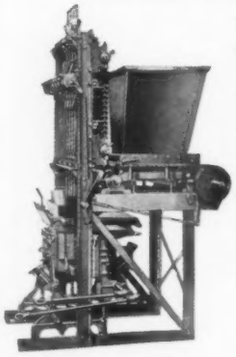
By MILES in QUALITY PRODUCTION



For DEPENDABLE SERVICE year in and out, select MILES CONCRETE EQUIPMENT for larger production of HIGH QUALITY products at a lower first cost and operating cost.

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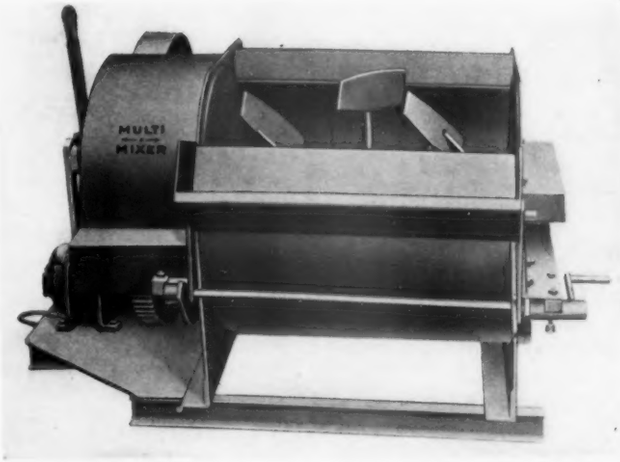
A Good Line to **BETTER PROFITS** in Concrete Blocks

NEW DESIGN MULTI-MIXER

TAMPERS

POWER PRESSES



HAND PRESS MACHINES

VARIABLE SPEED VIBRATION MACHINES

Time-tested Equipment

Here's the "Ace of Mixers," designed throughout to combine *high speed* concrete mixing with record low cost production. Reverse paddle action mixes any kind of aggregate twice as fast with less liner friction. Minimum power and maintenance requirements. Can be had in gear drive, belt or V-belt drive either end or side discharge. Six sizes.

Write for Catalog

The *Multiplex* CONCRETE MACHINERY CO., ELMORE, OHIO

Joltcrete LEADS!

Stearns Company, by its diligent exploitation during the past several years—in the face of much opposition—has convinced the concrete products industry that vibrated units excel all others. It must not be assumed that all vibrated units are good. Only by vibrating under pressure—*actual intense vibration while the pressure is being applied*—limited amplitude vibration—can the best units be made. Units that are maximum strength, uniform in density and appearance. Any deviation from this procedure is a compromise.

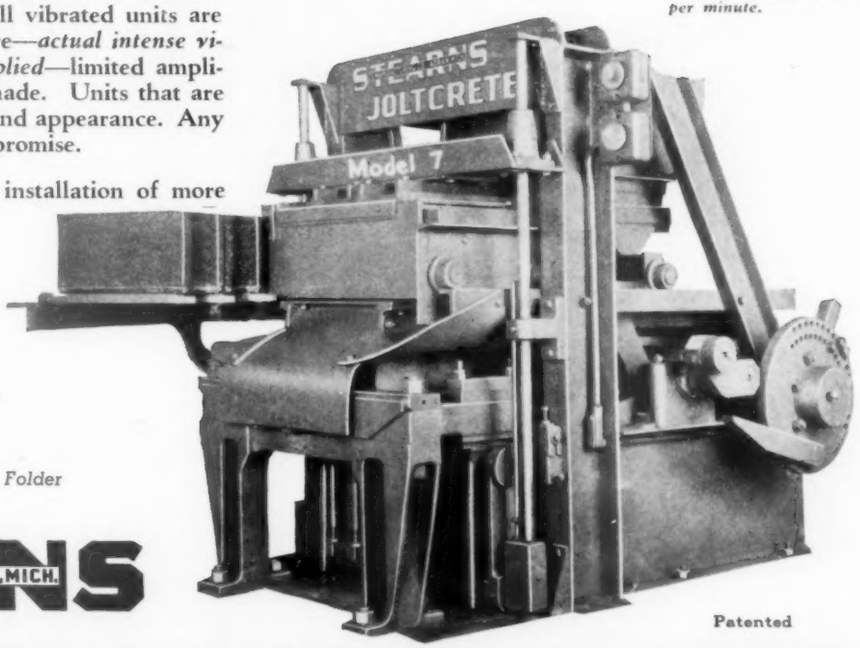
The above facts have resulted in the installation of more than seventy-five Stearns Joltcrete machines—far more than all competitive makes combined.

The Joltcrete method of *Vibration Under Pressure—Limited Amplitude Vibration*—is amply covered by patents. Users of infringing machines will be held accountable.

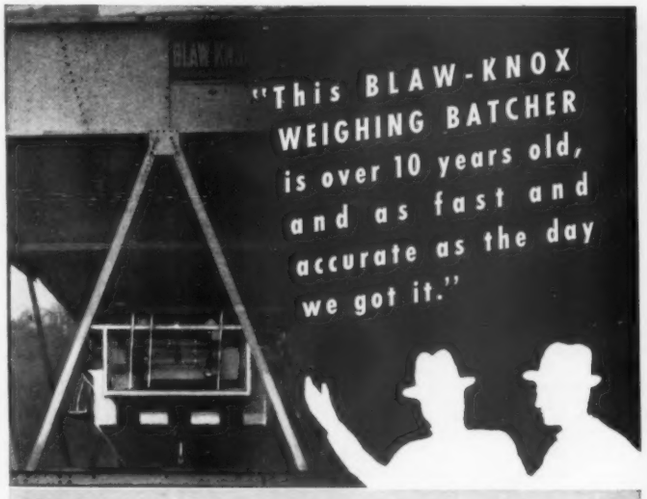
Write for the New Stearns Joltcrete Folder

STEARNS
MANUFACTURING CO. - ADRIAN, MICH.
GENE OLSEN, PRESIDENT

Stearns Joltcrete No. 7 makes seven 8x8x16-in. blocks per minute. The No. 9 makes nine per minute.



Patented

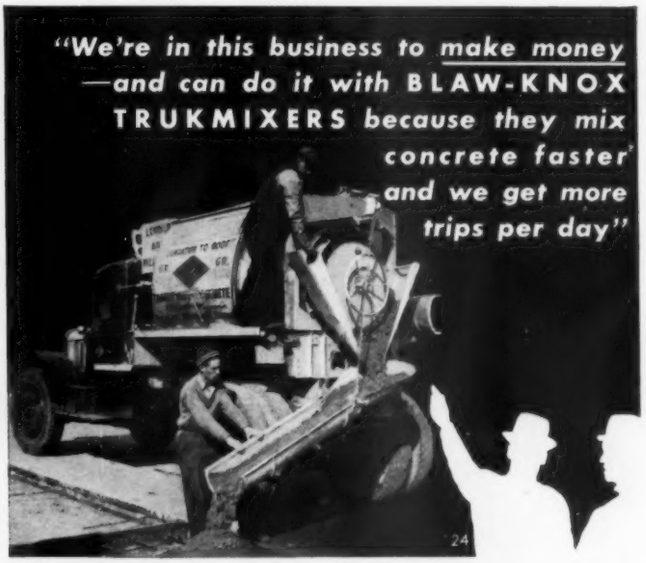


Built for maximum speed and accuracy in measuring AGGREGATES, CEMENT AND WATER, Blaw-Knox Weighing Batchers are standard equipment in widespread use by road contractors, for general construction, material yards, and ready mixed concrete plants. They satisfy all modern specifications. Furnished for manual or automatic operation.

The reliability of Blaw-Knox Weighing Batchers is acknowledged by thousands of users. Send for catalog No. 1566.

18

BLAW-KNOX BLAW-KNOX DIVISION · OF BLAW-KNOX CO. · Farmers Bank Bldg. Pittsburgh, Pa.
Weighing Batchers


"We're in this business to make money —and can do it with BLAW-KNOX TRUKMIXERS because they mix concrete faster and we get more trips per day"
24

It's a comfortable feeling to have truck mixers working for you that perform 100% under all conditions. No breakdowns—no worries.

You make a *profitable investment* when you buy Blaw-Knox Trukmixers and agitators. Write for Catalog No. 1582.

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Agitators and TRUKMIXERS

The CONCRETE MANUFACTURER

MANUFACTURING OPPORTUNITY

FOR AGGREGATE PRODUCERS — One that is complete and proven — Successful in many other aggregate plants. Ready for you to cash in big on the wide building upturn under way and the definite trend to more permanent, lower cost production.

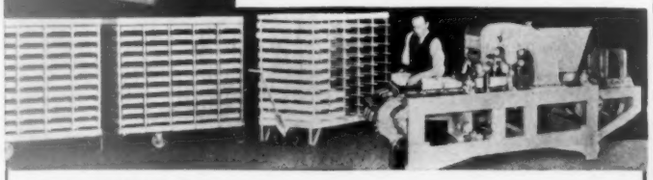
THIS OPPORTUNITY offers attractive earning power and future. Present manufacturers have proven and pioneered the way for you by establishing substantial businesses of their own. Today millions of products have been manufactured, thousands of buildings have been built with this material.

THIS OPPORTUNITY is the result of exclusive line production machinery which we will furnish. With it, plus other exclusive advantages, you will be able to supply the entire building trade with more attractive and permanent construction with savings at every step, from manufacturing to the completed job.

YOU WILL BE SUPPLIED with new processes, and formulas to enable you to manufacture products in 40 beautiful colors, shades and textures, using your surplus aggregate. Your product will be capable of meeting all known building requirements.

YOU WILL BE GRANTED manufacturing franchise covering your locality, protecting your market, business and future, with available engineering and advertising service for early expansion of your business.

YOU SHOULD INVESTIGATE while your territory is still open. Arrange to visit the nearest manufacturer and talk to the owner about this outstanding opportunity. So fill in coupon today. Perhaps the first step to a successful, profitable enterprise for you.



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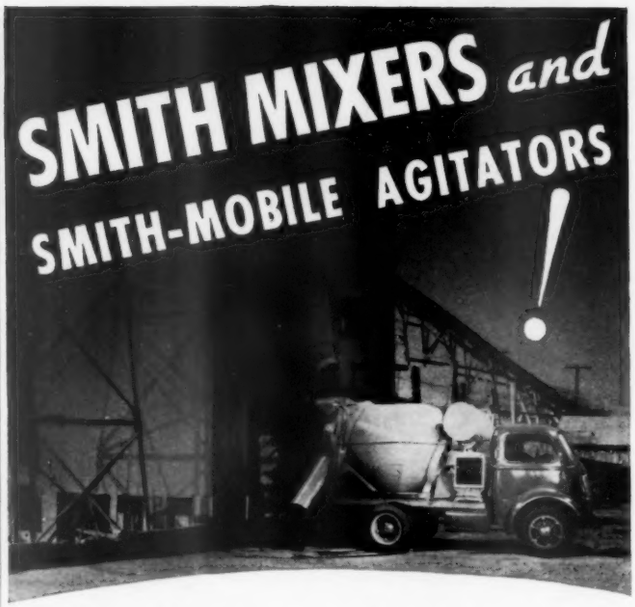
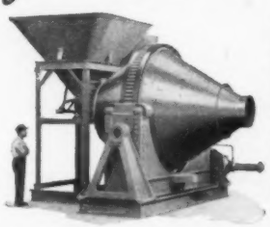
SMITH MIXERS and SMITH-MOBILE AGITATORS!



The Perfect Combination for PRE-MIX PLANTS



Smith 56-S Tilter with Hydraulic Tilt Unit and Batch-hopper. Pneumatic Tilt Unit Optional.

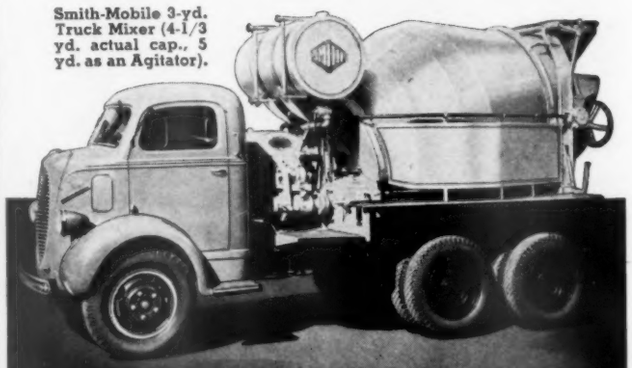
You're in the Ready-Mixed Concrete business to MAKE MONEY, and you CAN make money if you have the right equipment. Smith Tilting Mixers and Smith-Mobile Agitators have PROVEN their ability to mix and deliver uniform concrete at the lowest possible cost per yard. They're a winning combination — built and guaranteed by The T. L. Smith Company, concrete mixer manufacturers since 1900.

SMITH TILTING MIXERS for pre-mixing or pre-shrinking concrete. Famous all over the world for their *fast charging, thorough mixing* and *fast "tilt and pour" discharge*. Ideal for central pre-mix plants because of *low maintenance costs* and *rugged dependability*, even when worked night and day. Built in one, two, three and four yard sizes. Write for Catalog 160-A.

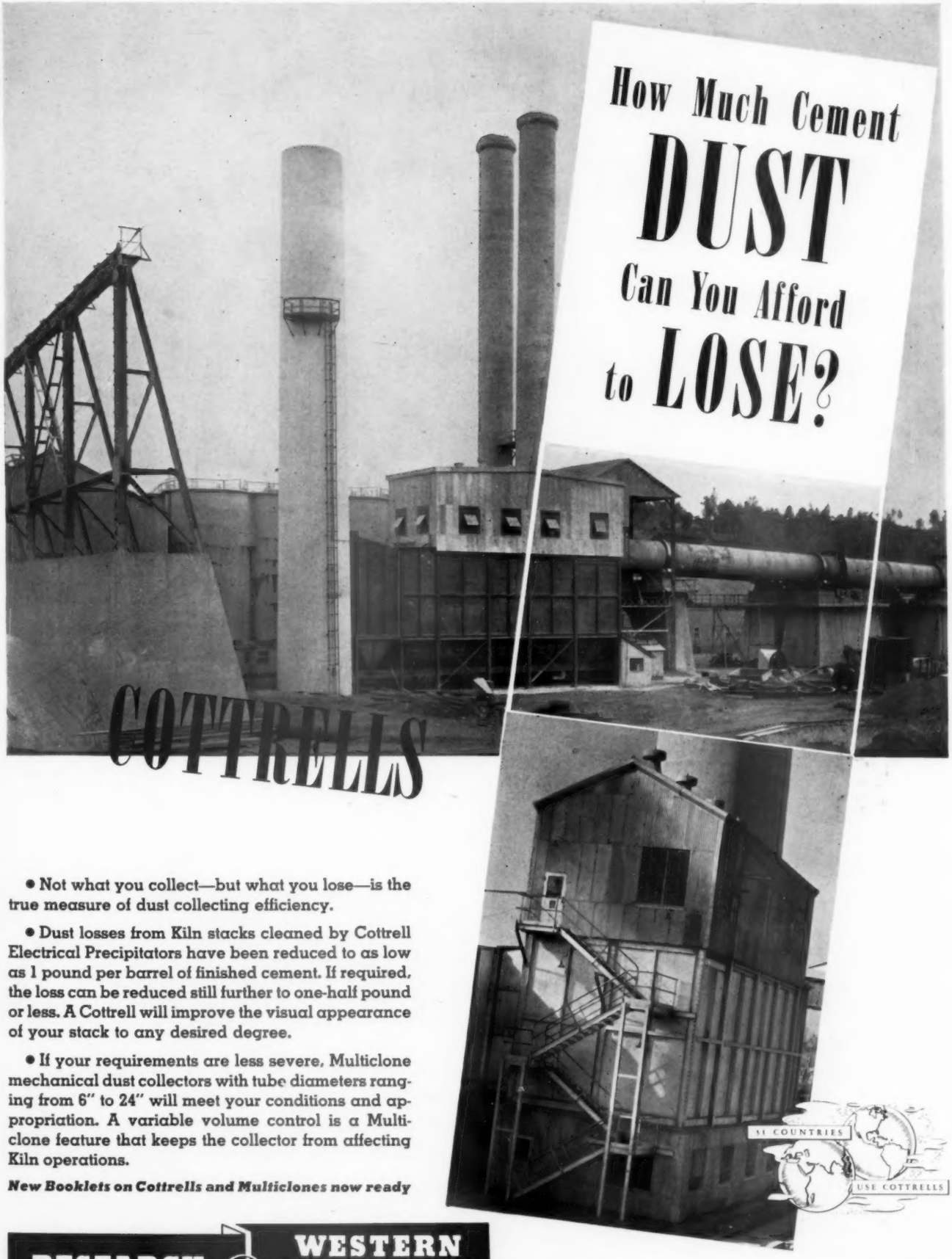
SMITH-MOBILE AGITATORS — ideal for delivering pre-mixed or pre-shrunk concrete. *Fast loading, smooth agitating, effective mixing, high discharge, fast complete discharge, slow controlled discharge, large radius of spout distribution*, etc. Smith-Mobile Agitators have all the superior advantages of the Smith-Mobile truckmixer. Four sizes. Write for Catalog 198.

THE T. L. SMITH COMPANY
2887 N. 32nd STREET • MILWAUKEE, WISCONSIN

Smith-Mobile 3-yd. Truck Mixer (4-1/3 yd. actual cap., 5 yd. as an Agitator).



SMITH-MOBILE
THE *Modern* TRUCK MIXER and AGITATOR



• Not what you collect—but what you lose—is the true measure of dust collecting efficiency.

• Dust losses from Kiln stacks cleaned by Cottrell Electrical Precipitators have been reduced to as low as 1 pound per barrel of finished cement. If required, the loss can be reduced still further to one-half pound or less. A Cottrell will improve the visual appearance of your stack to any desired degree.

• If your requirements are less severe, Multiclone mechanical dust collectors with tube diameters ranging from 6" to 24" will meet your conditions and appropriation. A variable volume control is a Multiclone feature that keeps the collector from affecting Kiln operations.

New Booklets on Cottrells and Multiclones now ready

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WESTERN PRECIPITATION CORPORATION
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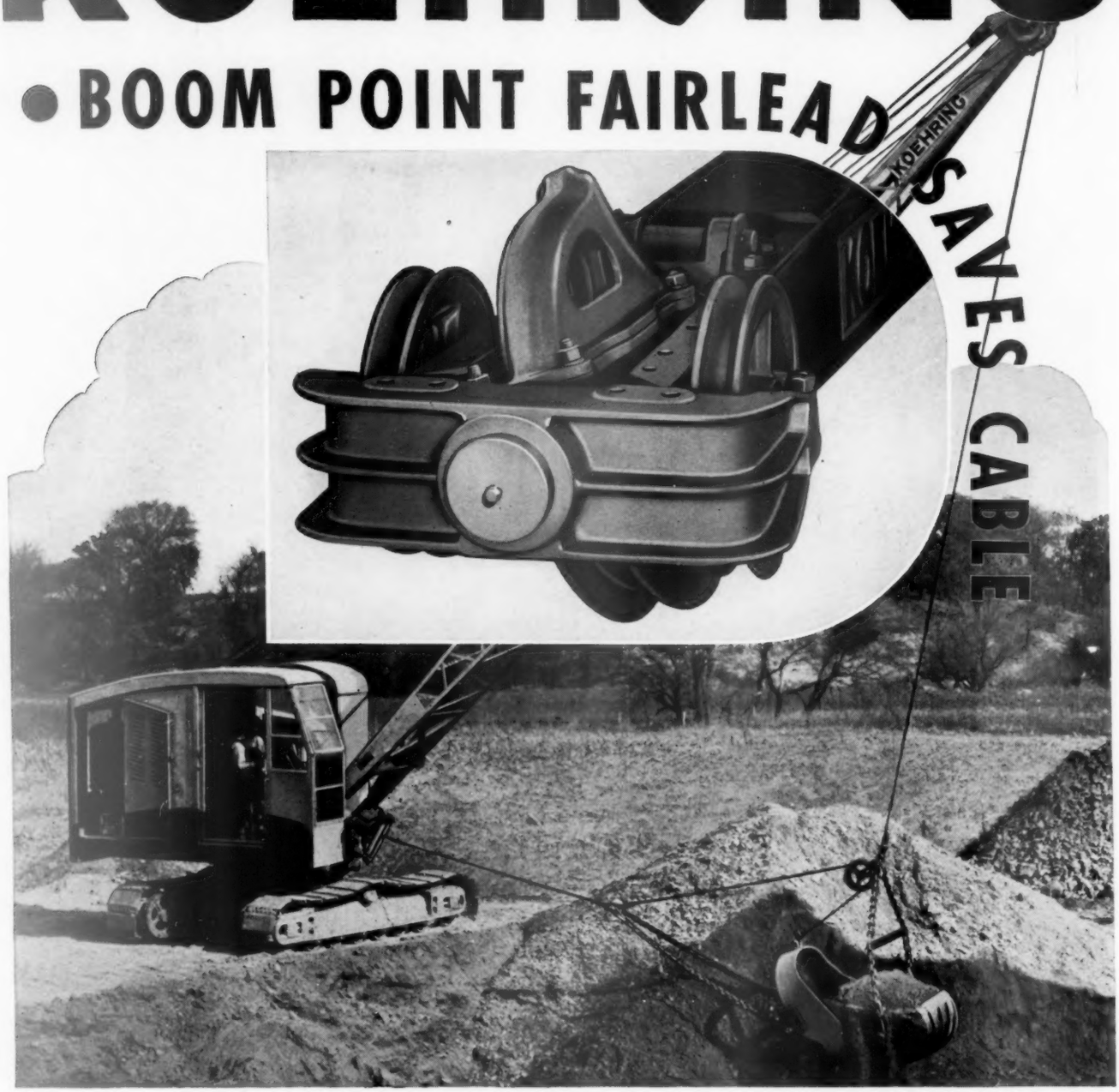
• Thirty-three years of international experience in the cement industry, with hundreds of installations operating at the lowest overall cost under guaranties backed by adequate financial resources, constitute your insurance of satisfaction.

KOEHRING

• BOOM POINT FAIRLEAD SAVES CABLE



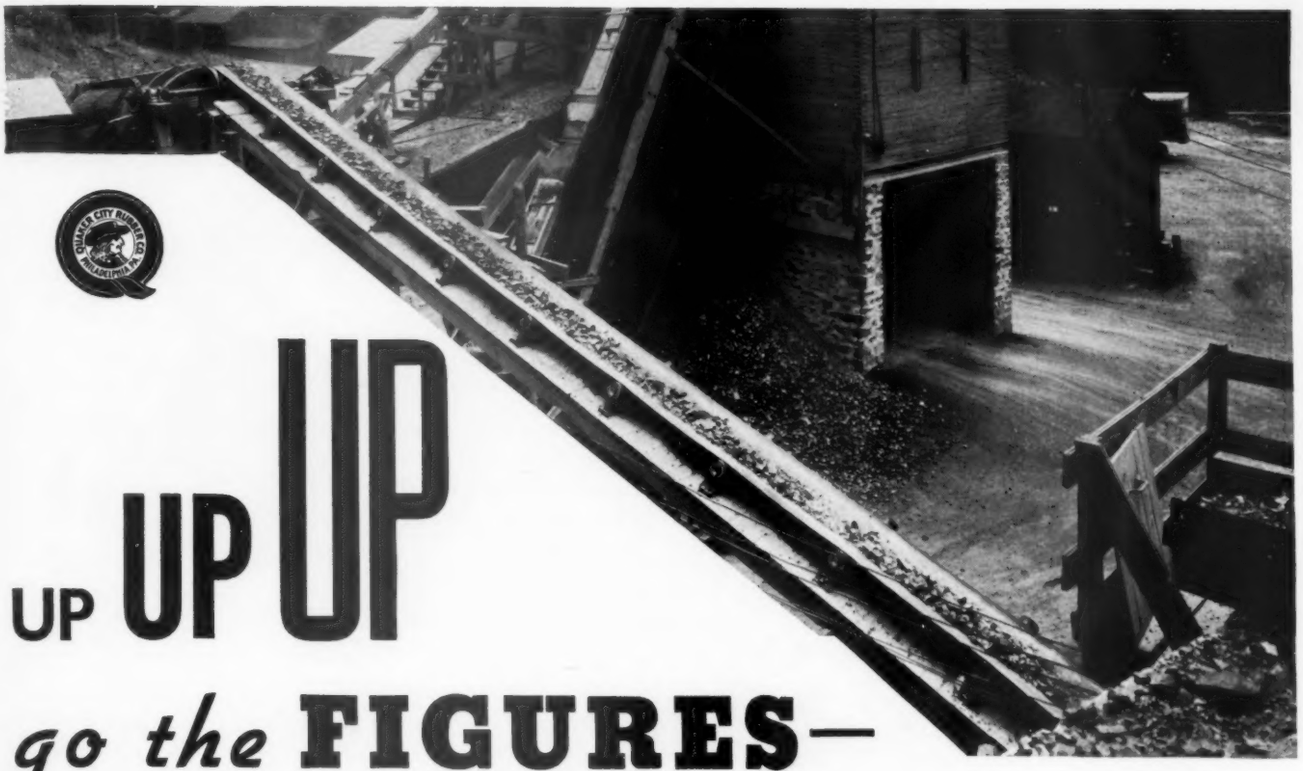
Koehring swiveling boom point fairlead reduces cable wear by maintaining a straight lead from sheave to bucket.

Cable life is extended with the use of the Koehring swiveling boom point fairlead. The bucket is free to swing without cable friction, greatly increasing the efficiency of operation. Cross pull of the cable is eliminated, thereby reducing cable wear materially. The large diameter sheaves always follow the cable lead, regardless of position of bucket, digging or dumping.

KOEHRING COMPANY • ***Milwaukee, Wis.***

KOEHRING HEAVY DUTY

HEAVY-DUTY CONSTRUCTION EQUIPMENT



UP UP UP

go the FIGURES—

more QUAKER *Conveyor Belts in use* NOW *than ever before*

More and more Quaker conveyor belts are being put in operation. Many of them you will find conveying sand, gravel, crushed stone, cement and kindred material.

More Quaker belts are being installed because they will stay on the job month after month—even where they are exposed to the weather.

Quaker conveyor belts are custom-built—they are made to fit your own particular conditions. Quaker belts are made with duck, impregnated with specially compounded rubber, giving it a strong, tenacious friction that fights separation. The duck is woven to our own specifications that puts to rout any excessive stretch. A Quaker belt stays on the job avoiding costly shut-downs. Quaker belts have what it takes . . . belts that stand up and deliver volume tonnage.

Recent QUAKER Conveyor Belt Orders

1020	feet	42" 4 ply	300	feet	24" 4 ply
700	"	36" 5 "	200	"	24" 5 "
1150	"	34" 8 "	305	"	20" 4 "
400	"	32" 8 "	120	"	20" 5 "
1400	"	30" 6 "	500	"	18" 5 "
667	"	30" 6 "	370	"	18" 4 "
840	"	24" 5 "	250	"	18" 4 "
500	"	24" 6 "	300	"	16" 4 "
500	"	24" 5 "	161	"	14" 6 "

It will profit you to let us figure on your next belting job

QUAKER CITY RUBBER COMPANY

OVER 50 YEARS OF CONSISTENT QUALITY

PHILADELPHIA · ***NEW YORK*** · ***CHICAGO*** · ***HOUSTON*** · ***SAN FRANCISCO***

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COMPLETE LIME PLANTS

1905 "Popularity Graph" 1940

KUNTZ installations have climbed steadily in favor for thirty-five years. The second generation of lime operators recognizes the basic superiority of lime and hydrate plants designed and engineered by KUNTZ specialists. Control and uniformity of product have established high records in this field—insuring minimum production costs per ton.

The KUNTZ Systems will sharply increase the rising "curve of profits" in your plant also. *Write for Information.*

LIME & HYDRATE PLANTS CO.
Box 574
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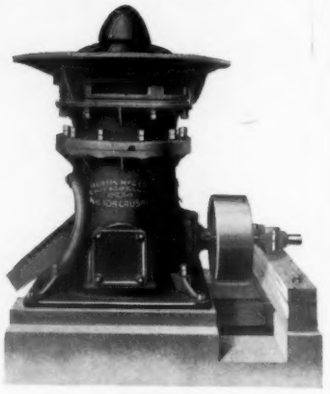
REPLACEMENT CRUSHERS

To you Established Owners of stationary Rock Crushing Plants this Proposal will appeal:—



Revamp your Plant with A NEW AUSTIN GYRATORY CRUSHER at a *Special Price Reduction* now offered.

These are Standard new products straight from the factory—fully guaranteed.

Let us know what your present Equipment is, and if you wish to maintain, reduce or increase capacity or alter size of production.

Our Field Engineers are glad to submit suggestions and plans—helpful towards achieving your object.

The LOW COST will surprise you—BUT act promptly—we have only a limited number in seven sizes at this *Special* Price.

BARGAIN EQUIPMENT
605 Farnsworth Ave., Aurora, Ill.

ROUND
SQUARE
SQUAROUND*
HEXAGON
PERFORATED PLATE
of every description
for maximum productiveness from your vibrating screens.
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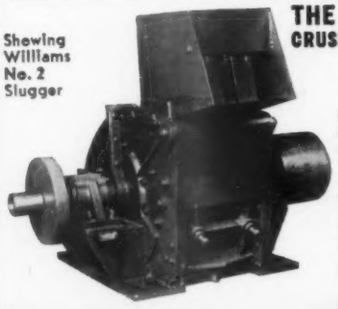
Sales Offices in Principal Cities. Please Consult Telephone Directory



Shewing Williams No. 2 Slugger

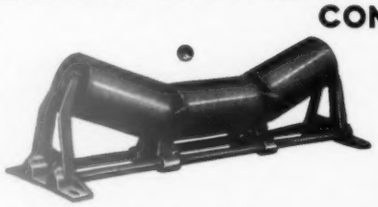
THE WILLIAMS "SLUGGER" CRUSHER *for* MAKING 1¼", ¾" OR AGSTONE
HANDLES LARGE STONE

Rows of heavy, free swinging, fast revolving hammers, crush the material by impact until of proper size to pass through the grates. By reducing large rock to 1¼", ¾" or agricultural size in one operation, the "Slugger" has enabled operators to produce these sizes at a very low cost per ton and with small investment.

WILLIAMS PATENT CRUSHER AND PULVERIZER COMPANY
802 St. Louis Ave. - St. Louis, Mo.

Williams
PATENT CRUSHERS GRINDERS SHREDDERS

DIAMOND *Anti-friction* CONVEYOR ROLLS



Latest type design. Timken bearings—with improved dust seals. Equipped for high pressure lubrication.

Write for further information

DIAMOND IRON WORKS INC.
AND THE MAHR MANUFACTURING CO. DIVISION
MINNEAPOLIS, MINNESOTA, U. S. A.

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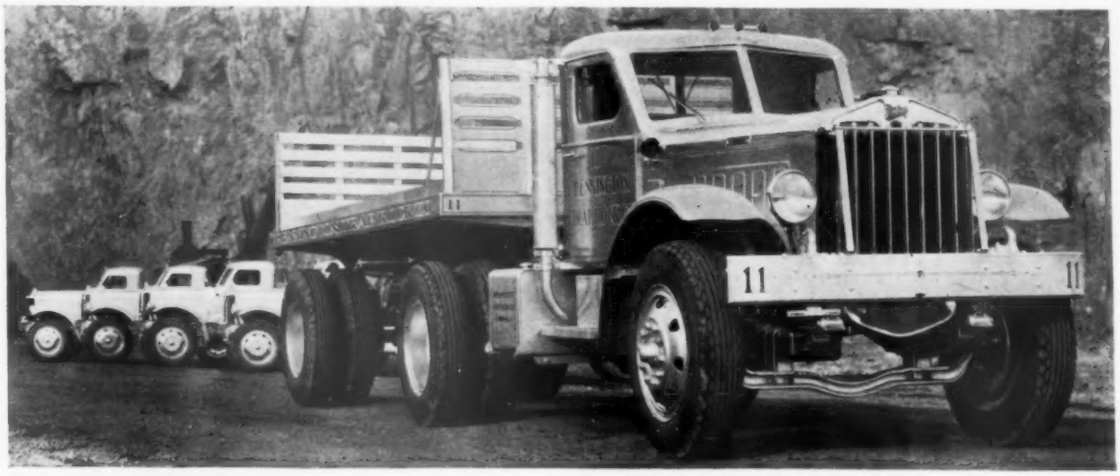
FORMERLY HOTEL PENNSYLVANIA
DANIEL CRAWFORD, JR., MANAGER
39th and CHESTNUT STREETS
PHILADELPHIA, PENNA

Our courteous and competent staff will give you the utmost in friendliness, comfort and service. Conveniently located to all stations, and only five minutes away from the heart of the business section.

600 ROOMS each with bath from $2.50 up

Lounge and Restaurants *Unrestricted Parking to 3 A.M.*



Sterling **QUARRY TRUCKS—BUILT FOR QUARRY WORK**

Performance, Economy, Dependability, and Sturdiness constitute the foundation upon which Sterling has built its reputation as a superior motor truck. Sterling motor trucks have been adopted by leading contractors everywhere who demand unfaltering service, large payloads, and low operating costs. Because Sterlings are built to meet your operating conditions, you are assured long, dependable service and greater profits.

Write for Literature descriptive of quality chassis built to meet your operating requirements.

STERLING MOTORS CORPORATION
MILWAUKEE, WIS.
Factory Branches in Principal Cities

Spiral Screw Type
Paddle Log Type
EAGLE Sand and Gravel Washers

SOARS TO NEW HIGH RECORDS!

The Twin Screw Eagle Washer for those with large capacity requirements. We recommend the Single Screw Washer when demands are smaller.

It takes an "EAGLE"—EVERY time—to establish performance records on sand and gravel cleaning jobs!

A twin screw Eagle Washer for recovering commercial sand was installed by the Concrete Materials Corporation of Waterloo, Ia. It recovers daily over six cars of sand which qualifies for the Illinois State Specifications, although originally only gravel was produced.

"Our Eagle Washer in use every day. Could not do without it; acceptable for any work. Never have rejections from improper preparation. Very little expense and very few repairs." (Name on request.)

Many other users testify to the superior efficiency and operating economy of Eagle Washers. With years of experience these machines have been developed to meet every requirement in the sand and gravel cleaning field—and to do it most profitably.

WATCH AN "EAGLE" SET THE PACE!

Write for our Bulletin describing Eagle Washers; also the Eagle "Swintek" Nozzle Ladder, designed to end all your dredging worries.

EAGLE · IRON · WORKS

129 Holcomb Avenue — Des Moines, Iowa

BUYERS' GUIDE

A Directory of Pit and Quarry Advertisers Indexed According to Product.

Although every effort is made to insure accuracy and completeness in these listings, the publisher cannot accept responsibility for errors or omissions. Any mistakes discovered will gladly be rectified.

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Aggregate-Bituminizing Plants
Hetherington & Berner, Inc.
McCarter Iron Works, Inc.
*Warren Brothers Roads Co.

Agitators, Thickeners and Slurry Mixers
*Hardinge Co.
*Smidth & Co., F. L.
*Traylor Engr. & Mfg. Co.

Air Compressors (Stationary)
Fuller Company
Gardner-Denver Co.

Air Conditioning
Jackson & Church Co.

Air Filters
*Blaw-Knox Co.
*Buell Engineering Co.
*Research Corp.
*Sly Mfg. Co., W. W.
*Western Precipitation Corp.

Air Pumps
Gardner-Denver Co.

Air Separators
*Hardinge Co.
Lime & Hydrate Plants Co.
*Raymond Pulverizer Division of the Combustion Engineering Co.
*Sly Mfg. Co., W. W.
*Williams Patent Crusher & Pulverizer Co.

Alloys (Steel)
Frog, Switch & Mfg. Co.
Manganese Steel Forge Co.
Stulz-Sickles Co.

Ash and Refuse Handling Equipment
*Haiss Mfg. Co., Geo.
Hetherington & Berner, Inc.
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.

Asphalt Mixing Plants
Hetherington & Berner, Inc.
McCarter Iron Works, Inc.
*Warren Brothers Roads Co.

Automatic Feeders
*Fuller Company
*Hardinge Co.
Jackson & Church Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
McCarter Iron Works, Inc.
*Merrick Scale Mfg. Co.
Schaffer Poidometer Co.

Automatic Weighers
*Blaw-Knox Co.
*Fuller Company
*Jaeger Machine Co.
McCarter Iron Works, Inc.
*Merrick Scale Mfg. Co.
Schaffer Poidometer Co.

Backfillers
*Austin-Western Road Machy. Co.
*Bucyrus-Erie Co.
Harnischfeger Corp.
Marion Steam Shovel Co.
Northwest Engineering Co.

Balls (Grinding)
*Hardinge Co.
*Jeffrey Mfg. Co.
Manganese Steel Forge Co.
*Smidth & Co., F. L.
Straub Mfg. Co.
*Traylor Engr. & Mfg. Co.

Barges (Steel)
*Chicago Bridge & Iron Co.

Bars Mills
Jackson & Church Co.

Battery Charging Equipment
*General Electric Co.

Bearings (Anti-Friction)
Hetherington & Berner, Inc.
*Link-Belt Co.
Robins Conveying Belt Co.
SKF Industries, Inc.
Sprout, Waldron & Co.

Bearings (Ball)
SKF Industries, Inc.

Bearings (Roller)
SKF Industries, Inc.

Belting
*Cincinnati Rubber Mfg. Co.
*Haiss Mfg. Co., Geo.
*Link-Belt Co.
Quaker City Rubber Co.
*Robins Conveying Belt Co.
Sprout, Waldron & Co.

Belts (Fan)
Quaker City Rubber Co.

Bin Gates
*Fuller Company
*Haiss Mfg. Co., Geo.
*Hendrick Mfg. Co.
Jackson & Church Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Manganese Steel Forge Co.
McCarter Iron Works, Inc.
McLanahan and Stone Corp.
*Robins Conveying Belt Co.
Smith Engr. Works
Sprout, Waldron & Co.

Bins (Concrete)
Marietta Concrete Corp.

Bins (Steel)
*Austin-Western Road Machy. Co.
*Blaw-Knox Co.
*Chicago Bridge & Iron Co.
*Diamond Iron Works
*Hendrick Mfg. Co.
Hetherington & Berner, Inc.
Jackson & Church Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Louisville Drying Machy. Co.
Manganese Steel Forge Co.
McCarter Iron Works, Inc.
McLanahan and Stone Corp.
*Robins Conveying Belt Co.
Sprout, Waldron & Co.
*Universal Crusher Co.

Bit Grinders
Gardner-Denver Co.

Blast-Hole Drills (See Drills—Blast-Hole)

Blasting Machines
Atlas Powder Co.
National Powder Co.

Blasting Supplies
Atlas Powder Co.
*Ensign-Bickford Co.
National Powder Co.

Block Cars
Miles Mfg. Co.

Block Machines (Concrete)
Anchor Concrete Machy. Co.
Dunn Mfg. Co., W. E.
*Kent Machine Co.
Miles Mfg. Co.
*Multiplex Concrete Machinery Co.
*Stearns Mfg. Co.

Block Machines (Power Press, Concrete)
Anchor Concrete Machy. Co.
Dunn Mfg. Co., W. E.
*Kent Machine Co.
*Multiplex Concrete Machinery Co.
*Stearns Mfg. Co.

Blocks (Sheave)
*Haiss Mfg. Co., Geo.
*Sauerman Bros., Inc.
Sprout, Waldron & Co.

Blowers
*Buell Engineering Co.
*Sly Mfg. Co., W. W.

Bodies (Motor Truck, Concrete Mixing)
*Blaw-Knox Co.
Jaeger Machine Co
Ransome Concrete Machy. Co.
*Smith Co., T. L.

Bodies (Dump Truck)
Commercial Shearing & Stamping Co.
*Easton Car & Construction Co.

Borings (Core)
Hoffman Bros. Drilling Co.
Pennsylvania Drilling Co.

Breakers (Circuit)
*General Electric Co.

Brick Machines (Concrete)
Dunn Mfg. Co., W. E.
Miles Mfg. Co.
*R & L Concrete Machy. Co.
*Stearns Mfg. Co.

Brick Manufacturing Equipment
Dunn Mfg. Co., W. E.
Jackson & Church Co.
*Stearns Mfg. Co.

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Buckets (Asphalt)
McCarter Iron Works, Inc.

Buckets (Clamshell, Orange-Peel, Etc.)
*Blaw-Knox Co.
Frog, Switch & Mfg. Co.
*Haiss Mfg. Co., Geo.
Harnischfeger Corp.
*Link-Belt Co.
Owen Bucket Co.

Buckets (Dragline—Cableway)
*Bucyrus-Erie Co.
*Link-Belt Co.
Page Engineering Co.
*Sauerman Bros., Inc.

Buckets (Dump)
*Dempster Bros. Inc.
*Jaeger Machine Co.

Buckets (Elec. Heated, Weighing)
*Easton Car & Construction Co.
McCarter Iron Works, Inc.

Buckets (Elevator and Conveyor)
*Haiss Mfg. Co., Geo.
*Hendrick Mfg. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
McLanahan and Stone Corp.
Manganese Steel Forge Co.
*Robins Conveying Belt Co.
Smith Engr. Works
Sprout, Waldron & Co.

Buggies (Dump)
*Koehring Co.
*Le Tourneau, Inc., R. G.

Bulk-Cement Storage Plants
*Chicago Bridge & Iron Co.
McCarter Iron Works, Inc.
Sprout, Waldron & Co.

Bulldozers
*Le Tourneau, Inc., R. G.

Cable (Electric)
*General Electric Co.

Cableways
Page Engineering Co.
*Roebling's Sons Co., John A
*Sauerman Bros., inc.

Capacitors
*General Electric Co.

Caps (Blasting)
Atlas Powder Co.
National Powder Co.

Caps (Blasting, Electric)
Atlas Powder Co.
National Powder Co.

Capstans (See Winches and Capstans)

Car Control Systems
*General Electric Co.

Car Dumpers
*Link-Belt Co.

Car Pullers
Jackson & Church Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.

Car Wheels — (See Wheels — Car)

Carriers
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.
Smith Engr. Works
Sprout, Waldron & Co.

Carryalls
*Austin-Western Road Machy. Co.
*Koehring Co.
*Le Tourneau, Inc., R. G.

Cars (Block, Concrete)
*Link Belt Co.
*Multiplex Concrete Machinery Co.

Cars (Industrial)
*Easton Car & Construction Co.

Cars (Quarry and Gravel Pit)
*Austin-Western Road Machy. Co.

Castings
*Eagle Iron Works
Frog, Switch & Mfg. Co.
*Hardinge Co.
Hetherington & Berner, Inc.
*Jeffrey Mfg. Co.
*Link-Belt Co.
McLanahan & Stone Corp.
*Robins Conveying Belt Co.
Sprout, Waldron & Co.

Castings (Gray Iron)
Jackson & Church Co.

Cement Pumps (See Pumps; Air Pumps; Pumps, Cement Slurry; Pumps, Bulk Cement)

Central Concrete Mixing Plants (Comp.)
*Jaeger Machine Co.
McCarter Iron Works, Inc.
Sprout, Waldron & Co.

Chain (Dredge and Shovel)
Manganese Steel Forge Co

Chain Drives
*Link-Belt Co.

Chain (Elevating and Conveying)
*Haiss Mfg. Co., Geo.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Manganese Steel Forge Co.
*McLanahan and Stone Corp
Sprout, Waldron & Co.

Chutes and Chute Liners
Frog, Switch & Mfg. Co.
*Haiss Mfg. Co., Geo.
*Hendrick Mfg. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Manganese Steel Forge Co.
McCarter Iron Works, Inc.
McLanahan and Stone Corp.
*Robins Conveying Belt Co.
*Smidth & Co., F. L.
Sprout, Waldron & Co.

Classifiers
*Deister Machine Co.
*Hardinge Co.
Lewistown Foundry & Machine Co.
*Link-Belt Co.
*Nordberg Mfg. Co.
Simplicity Engineering Co.
Straub Mfg. Co.

Clips (Wire Rope)
*Roebling's Sons Co., John A

Clutches
*Jeffrey Mfg. Co.
*Link-Belt Co.
Sprout, Waldron & Co.

Coal-Pulverizing Equipment
*Hardinge Co.
*Jeffrey Mfg. Co.
*Raymond Pulverizer Division of the Combustion Engineering Co.
*Smidth & Co., F. L.
*Traylor Engr. & Mfg. Co.
*Universal Crusher Co.
*Williams Patent Crusher & Pulverizer Co.

Compressors (See Air Compressors)

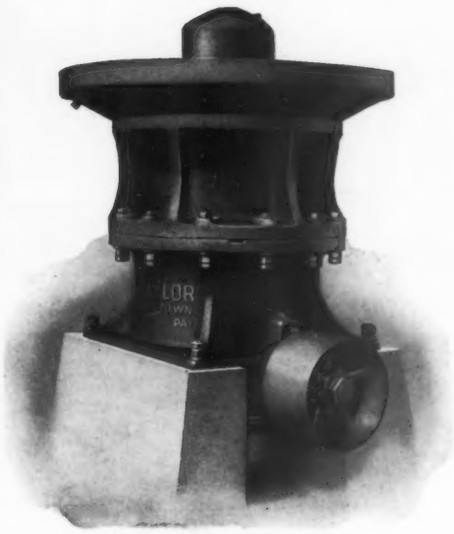
Concentrating Tables
*Deister Concentrator Co.
Deister Machine Co.

Concentrators (Slurry)
*Deister Concentrator Co.

Concrete Breakers (Air)
Gardner-Denver Co.

Dipper Parts
Frog, Switch & Mfg. Co.

*See also detail information in the 1939 Pit and Quarry HANDBOOK.



Our Type H Jaw Crusher is the lightest, strongest and most efficient Blake type crusher ever built. See our Bulletin 1105.

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TY REDUCTION CRUSHERS

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there is never any doubt that it will go through a day's work, — or months and years—faithfully, efficiently and economically,—a matter-of-course machine that an operator is likely to forget he has!

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MANY SAVINGS REALIZED IN MODERNIZING SLY DUST FILTER

5 WAYS A CEMENT COMPANY SAVED

1. Achieved greater accessibility to filter
2. Saved space required for installation
3. Improved the shaking action for dust removal
4. Facilitated replacement of any bag without disturbing filter assembly
5. Greatly increased efficiency of filter while making substantial savings in operation.

You, too, may have an old dust filter which you want to bring up to date and make more profitable as did a prominent cement company.

This firm had a Sly flat screen type Dust Arrester purchased some time ago. By modernization they accomplished many savings as shown herewith.

Their unit consisted of a 32′ long Sly Dust Filter. By installing new style filter parts in only 15 feet of their old case, they increased the effective cloth area—by 12%. The balance of the case was converted into a classifier or settling chamber, resulting in a large percentage of the dust being precipitated without actually getting into the filter cloth section. This increases the efficiency of the filter, prolongs the life of the bags, and reduces the static resistance to the flow of air, thereby keeping the power at the fan down to an absolute minimum. The new automatic timing equipment for proper shaking of the bag helps keep their dust control equipment operating at maximum efficiency.

It really does *not* pay to operate an old dust filter. Let us demonstrate the savings of modernization.

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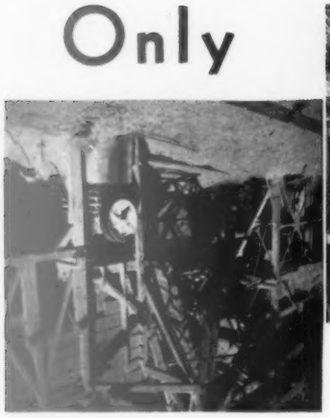

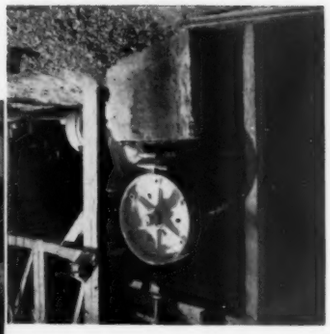

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You've guessed it—it's a Universal Crusher and the low maintenance cost is characteristic of Universal Crushing Equipment.

14 years ago (July, 1925), River Products Company bought a No. 836 Universal Bronze Bearing Crusher. Over 1¼ million tons had passed through the plant up to July of this year; over ¼ million tons crushed with the Universal full all of the time and set at ½".

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Total maintenance costs over 14 years averaged only $52.34 a year; 3-10 of a cent a ton—maintenance for a year paid for with one day's output.

Proving again that you can't beat Universals for low maintenance cost—and low operating and first cost, too!

Any pit or quarry operator can take the guesswork out of profits with a Universal and there's a Universal Crusher, Portable Unit, and Stationary, Portable and Semi-Portable Crushing Plant for every material requirement.

Over 33 years originating, designing, and building Crushing Equipment exclusively—that's why operators get what they should have for utmost economy of operation when they buy Universal!

Write for new catalog.

UNIVERSAL CRUSHER COMPANY

619 C Avenue West — Cedar Rapids, Iowa

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BUYERS' GUIDE

A Directory of Pit and Quarry Advertisers Indexed According to Product.

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Concrete Slab Raising Equipment (Mud Jacks)
- *Koehring Co.

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- *Chicago Bridge & Iron Co.
- *Link-Belt Co.
- Smith Engr. Works

Controllers (Electric)
- *General Electric Co.

Converters (Electric)
- *General Electric Co.

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- *Haiss Mfg. Co., Geo.
- *Link-Belt Co.
- Quaker City Rubber Co.
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- Sprout, Waldron & Co.

Conveyor Idlers and Rolls
- *Barber-Greene Co.
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- *Haiss Mfg. Co., Geo.
- Jackson & Church Co.
- *Jeffrey Mfg. Co.
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- Bacon, Inc., Earle C.
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- *Haiss Mfg. Co., Geo.
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- New Holland Machine Co
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- Straub Mfg. Co.
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Conveyors (Pneumatic)
- *Fuller Company

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- *Blaw-Knox Co.
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- *Jeffrey Mfg. Co.
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- *Fuller Co.
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Couplings (Flexible and Shaft)
- *Jeffrey Mfg. Co.
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- Sprout, Waldron & Co.

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- *Austin-Western Road Machy. Co.
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- *Koehring Co.
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- Northwest Engineering Co.
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- *American Pulverizer Co.
- Frog, Switch & Mfg. Co.
- *Jeffrey Mfg. Co.
- McLanahan and Stone Corp.
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- *Universal Crusher Co.

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- *American Pulverizer Co.
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- *Jeffrey Mfg. Co.
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- Straub Mfg. Co.
- *Universal Crusher Co.
- *Williams Patent Crusher & Pulverizer Co.

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- *Austin-Western Road Machy. Co.
- Bacon, Inc., Earle C.
- *Diamond Iron Works
- *Jeffrey Mfg. Co.
- Lewistown Foundry & Machine Co.
- *McLanahan and Stone Corp.
- New Holland Machine Co.
- *Nordberg Mfg. Co.
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- Straub Mfg. Co.
- *Traylor Engr. & Mfg. Co.
- *Universal Crusher Co.

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- *American Pulverizer Co.
- *Williams Patent Crusher & Pulverizer Co.

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- *American Pulverizer Co.
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- *Diamond Iron Works
- *Jeffrey Mfg. Co.
- *Link-Belt Co.
- McLanahan and Stone Corp.
- New Holland Machine Co.
- *Robins Conveying Belt Co.
- Straub Mfg. Co.
- *Universal Crusher Co.
- *Williams Patent Crusher & Pulverizer Co.

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- *American Pulverizer Co.
- *Austin-Western Road Machy. Co.
- Jackson & Church Co.
- New Holland Machine Co.
- *Williams Patent Crusher & Pulverizer Co.

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- *Austin-Western Road Machy. Co.
- Frog, Switch & Mfg. Co.
- *Jeffrey Mfg. Co.
- *Link-Belt Co.
- McLanahan and Stone Corp.
- New Holland Machine Co.
- Straub Mfg. Co.
- *Traylor Engr. & Mfg. Co.
- *Williams Patent Crusher & Pulverizer Co.

Cutter Heads (Dredging)
- *Eagle Iron Works

Detonators
- Atlas Powder Co.
- National Powder Co.

Diaphragms (Rubber)
- Quaker City Rubber Co.

Diesel Engines (See Engines—Diesel)

* See also detail information in the 1939 Pit and Quarry HANDBOOK.

Dippers and Teeth (Power Shovel)
*Bucyrus-Erie Co.
Frog, Switch & Mfg. Co.
*Koehring Co.

Dragline Cableway Excavators
*Bucyrus-Erie Co.
*Link-Belt Co.
Page Engineering Co.
*Sauerman Bros., Inc.

Dragline Excavators
*Austin-Western Road Machy. Co.
*Bay City Shovels, Inc.
*Bucyrus-Erie Co.
Harnischfeger Corp.
Jackson & Church Co.
*Koehring Co.
*Link-Belt Co.
Marion Steam Shovel Co.
Northwest Engineering Co.
Page Engineering Co.
Thew Shovel Co.

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*Bucyrus-Monighan Co.

Dredges
*Bucyrus-Erie Co.
Hetherington & Berner, Inc.
*Morris Machine Works

Driers
*Chicago Bridge & Iron Co.
*Hardinge Co.
Jackson & Church Co.
Lewistown Fdry. & Machine
Lime & Hydrate Plants Co.
*Link-Belt Co.
Louisville Drying Machy. Co.
McCarter Iron Works, Inc.
McLanahan & Stone Corp.
*Traylor Eng. & Mfg. Corp.
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Drill Bit Reconditioning
*Bucyrus-Erie Co.

Drill Bits
*Bucyrus-Erie Co.

Drill Sharpening Machinery
*Bucyrus-Erie Co.
Gardner-Denver Co.

Drilling Accessories
*Bucyrus-Erie Co.
Gardner-Denver Co.

Drilling Contractors
Hoffman Bros. Drilling Co.
Pennsylvania Drilling Co.

Drills (Blast-Hole)
*Bucyrus-Erie Co.
Gardner-Denver Co.

Drills (Core)
Hoffman Bros. Drilling Co.
Pennsylvania Drilling Co.

Drills (Diamond)
Hoffman Bros. Drilling Co.
Pennsylvania Drilling Co.

Drills (Drifting)
Gardner-Denver Co.

Drills (Hand—Hammer)
Gardner-Denver Co.

Drills (Rock)
Gardner-Denver Co.
*Jeffrey Mfg. Co.

Drills (Sinking)
Gardner-Denver Co.

Drills (Stoping)
Gardner-Denver Co.

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*Bucyrus-Erie Co.
Gardner-Denver Co.

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Drives (Multiple Belt, Chain, Rope)
*Link-Belt Co.

Dust Arresters
*Blaw-Knox Co.
*Buell Engineering Co.
*Research Corp.
*Sly Mfg. Co., W. W.
*Western Precipitation Corp.

Dust Collecting Systems
*Blaw-Knox Co.
*Buell Engineering Co.
McCarter Iron Works, Inc.
*Raymond Pulverizer Division of the Combustion Engineering Co.
*Research Corp.
*Sly Mfg. Co., W. W.
*Western Precipitation Corp.

Dust Conveying Systems
*Blaw-Knox Co.
*Buell Engineering Co.
*Fuller Company
*Research Corp.
*Sly Mfg. Co., W. W.
*Western Precipitation Corp.

Dust Filters
*Buell Engineering Co.
*Research Corp.
*Sly Mfg. Co., W. W.
*Western Precipitation Corp.

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*General Electric Co.

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*General Electric Co.

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Wall-Colmonoy Corp.

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Engineers
Bacon, Inc., Earle C.
*Fuller Company
Hetherington & Berner, Inc
Lime & Hydrate Plants Co.
McLanahan and Stone Corp.
*Robins Conveying Belt Co.
*Smidth & Co., F. L.
Sprout, Waldron & Co.
*Traylor Engr. & Mfg. Co.

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Engines (Diesel)
Caterpillar Tractor Co.
Cummins Engine Co.
National Supply Co. of Del.
*Nordberg Mfg. Co.
Page Engineering Co.
Superior Diesel Engine Division of The National Supply Co.

Engines (Internal-Combustion)
Caterpillar Tractor Co.
Cummins Engine Co.
National Supply Co.
*Nordberg Mfg. Co.
Page Engineering Co.
Superior Diesel Engine Division of The National Supply Co.

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*Morris Machine Works
*Nordberg Mfg. Co.

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Excavators—Shallow Grading (Bucket Elevator Type)
*Haiss Mfg. Co., Geo.

Explosives
Atlas Powder Co.
National Powder Co.

Fabricating (Electric Arc and Oxy Acetylene)
Stulz-Sickles Co.

Fans (Exhaust)
*General Electric Co.
*Jeffrey Mfg. Co.

Feeders
*Diamond Iron Works
*Fuller Company
*Hardinge Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
McCarter Iron Works, Inc.
*McLanahan and Stone Corp.
*Merrick Scale Mfg. Co.
*Robins Conveying Belt Co.
Smith Engr. Works
Sprout, Waldron & Co.
Straub Mfg. Co.
*Traylor Engr. & Mfg. Co.
*Universal Crusher Co.

Filters (Cement)
Louisville Drying Machy. Co.

Forges (Oil)
Gardner-Denver Co.

Furnaces (Heat Treating, Electric)
*General Electric Co.

Fuses (Detonating)
Atlas Powder Co.
*Ensign-Bickford Co.
National Powder Co.

Fuses (Electrical)
*General Electric Co.

Gaskets
*Cincinnati Rubber Mfg. Co.
Quaker City Rubber Co.

Gasoline Engines (See Engines—Internal-Combustion)

Gates (Bin) (See Bin Gates)

Gates (Clamshell)
*Haiss Mfg. Co., Geo.
*Link-Belt Co.

Gear Motors
*General Electric Co.

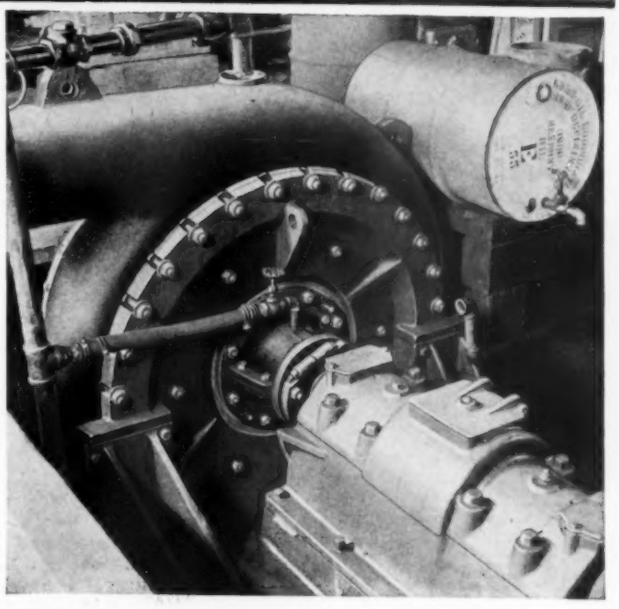
Gears (Herringbone)
*General Electric Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Sprout, Waldron & Co.

Gears and Pinions
*General Electric Co.
*Haiss Mfg. Co., Geo.
*Jeffrey Mfg. Co.

* See also detail information in the 1939 Pit and Quarry HANDBOOK.

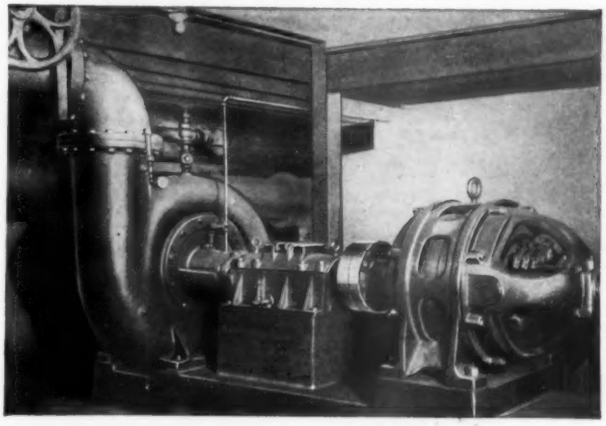
The MORRIS HYDRAULIC COLUMN

News of interest to Centrifugal Pump Users



Dredging performance 25% better than guaranteed

This 28-in. Morris Dredging Pump was guaranteed to deliver 28,000 g.p.m. of sand-bearing water. In service, it actually delivers 35,000 g.p.m. without overloading the motor. Morris customers know that Morris Centrifugal Pumps and Dredges can be relied upon to do better than promised—both in efficiency and in maintenance economy. That is why Morris receives so many repeat orders—the surest indication of satisfactory performance. Bulletins describing Morris Pumps and Dredges sent on request.



"Please send repair parts" . . . . after half a century of service

Even we, who know so well the stamina of Morris Pumps, are sometimes surprised at service reports which come to our attention. For example, we have recently received requests for new parts for three Morris Pumps between 45 and 50 years old, all from different customers and operating on different services. Bear Morris Pump stamina in mind when you need centrifugal pumps for *any* service, and always be sure to get a Morris quotation.

MEMBER

For authoritative recommendations on any pumping or dredging problem, write Morris Machine Works, Baldwinsville, N. Y. Export Office: 30 Church St., New York, N. Y.

BUYERS' GUIDE

A Directory of Pit and Quarry Advertisers Indexed According to Product.

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Generator Sets (Engine)
*General Electric Co.
National Supply Co. of Del.
Superior Diesel Engine Division of The National Supply Co.

Generator Sets (Motor)
*General Electric Co.

Generator Sets (Turbine)
*General Electric Co.

Generators (See Motors and Generators)

Glass Sand Equipment
Lewistown Foundry & Machine Co.

Grab Buckets (See Buckets—Clamshell, Orange - Peel, etc.)

Grapples
Owen Bucket Co.

Grating (Steel)
*Blaw-Knox Co.
*Hendrick Mfg. Co.

Grinding Balls (See Balls, Grinding)

Grizzly Feeders
*Link-Belt Co.
*Traylor Engr. & Mfg. Co.

Grizzlies
*Eagle Iron Works
*Hendrick Mfg. Co.
Lewistown Fdry. & Mach. Co.
*Link-Belt Co.
Manganese Steel Forge Co.
*Robins Conveying Belt Co.
Smith Engr. Works

Guards (Wire)
Manganese Steel Forge Co.

Guns (Hydraulic)
Hetherington & Berner, Inc.
Taylor Forge & Pipe Works

Hammer Mills (See Crushers—Hammer)

Hand Operated Stripper Machines
Miles Mfg. Co.

Hard Facing Metals
Wall-Colmonoy Corp.

Haulage Systems (Electric)
*General Electric Co.

Heaters (Bitumen)
*Easton Car & Construction Co.
McCarter Iron Works, Inc.

Hoists
Commercial Shearing & Stamping Co.
Gardner-Denver Co.
Harnischfeger Corp.
Hetherington & Berner, Inc.
Jackson & Church Co.
*Jaeger Machine Co.
*Jeffrey Mfg. Co.
McLanahan and Stone Corp.
*Sauerman Bros., Inc.
Smith Engr. Works
Sprout, Waldron & Co.

Hoppers
*Chicago Bridge & Iron Co.
*Hendrick Mfg. Co.
*Link-Belt Co.
Manganese Steel Forge Co.
McCarter Iron Works, Inc.

Hose (Air, Steam and Water)
*Cincinnati Rubber Mfg. Co.
Quaker City Rubber Co.

Hose (Fire & Suction)
Quaker City Rubber Co.

Hose (Radiator-Engine Cooling)
Quaker City Rubber Co.

Hose Couplings (See Couplings)

Hydrate Plants (Complete)
Lime & Hydrate Plants Co.

Hydrators
Lime & Hydrate Plants Co.

Hydraulic Guns (See Guns—Hydraulic)

Idlers
*Barber-Greene Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.
Smith Engr. Works
Sprout, Waldron & Co.

Indicators (Material Level)
*Fuller Company

Instruments (Electrical)
*General Electric Co.

Insulation (Electric)
*General Electric Co.

Joist and Slab Machines (Concrete)
R & L Concrete Machy. Co.

Kilns and Coolers (Rotary)
*Chicago Bridge & Iron Co.
*Hardinge Co.
Lime & Hydrate Plants Co.
*Link-Belt Co.
Louisville Drying Machy. Co.
McCarter Iron Works, Inc.
*Smidth & Co., F. L.
*Traylor Engr. & Mfg. Co.

Kilns (Vertical)
*Chicago Bridge & Iron Co.
*Hardinge Co.
Lime & Hydrate Plants Co.

Kominuters
*Smidth & Co., F. L.

Ladders (Agitating Dredge)
*Eagle Iron Works

Ladders (Hydraulic Dredge)
*Eagle Iron Works

Lighting
*General Electric Co.

Lime and Hydrating Plants
*Chicago Bridge & Iron Co.
*Hardinge Co.
Lime & Hydrate Plants Co.

Lime-Handling Equipment
*Chicago Bridge & Iron Co.
*Fuller Company
*Hardinge Co.
Jackson & Church Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Raymond Pulverizer Division of the Combustion Engineering Co.
*Robins Conveying Belt Co.
*Traylor Engr. & Mfg. Co.

Lime Kilns
*Chicago Bridge & Iron Co.
*Hardinge Co.
Lime & Hydrate Plants Co.

Lime Plants (Complete)
*Hardinge Co.
Lime & Hydrate Plants Co.

Lime Putty Plants
*Chicago Bridge & Iron Co.

Linings (Ball- and Tube-Mill) (See Mill Liners and Linings)

Loaders and Unloaders
*Barber-Greene Co.
*Bucyrus-Erie Co.
*Fuller Company
*Haiss Mfg. Co., Geo.
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.
Sprout, Waldron & Co.

Locomotives (Diesel)
Davenport Locomotive Works
Plymouth Loco. Works Div. of the Fate-Root-Heath Co.

Locomotives (Diesel-Electric)
Davenport Locomotive Works
*General Electric Co.
Plymouth Loco. Works Div. of the Fate-Root-Heath Co.

Locomotives (Elec., Gas, Steam)
Davenport Locomotive Works
*General Electric Co.

Locomotives (Gas-Electric)
Davenport Locomotive Works
*General Electric Co.
Plymouth Loco. Works Div. of the Fate-Root-Heath Co.

Locomotives (Oil-Electric)
Davenport Locomotive Works
*General Electric Co.
Plymouth Loco. Works Div. of the Fate-Root-Heath Co.

Locomotives (Storage Battery)
Davenport Locomotive Works
*General Electric Co.

Locomotives (Trolley Battery)
Davenport Locomotive Works
*General Electric Co.
*Jeffrey Mfg. Co.

Magnetic Pulleys (See Pulleys, Magnetic)

Magnets
*General Electric Co.

Manganese Steel
Frog, Switch & Mfg. Co.
Manganese Steel Forge Co.

Manganese Steel (Plates and Sheets)
Manganese Steel Forge Co.

Manganese Steel Castings
Frog, Switch & Mfg. Co.

Measuring Devices (Electric)
*General Electric Co.

Mechanical Rubber Goods
*Cincinnati Rubber Mfg. Co.
Quaker City Rubber Co.

Meters
*General Electric Co.

Mill Liners and Linings
*Hardinge Co.
*Jeffrey Mfg. Co.
*Smidth & Co., F. L.
*Traylor Engr. & Mfg. Co.

Mills (Ball, Tube, etc.)
*Hardinge Co.
*Traylor Engr. & Mfg. Co.

Mills (Grinding) (See also Crushers—Hammer)
*American Pulverizer Co.
*Hardinge Co.
Jackson & Church Co.
*Jeffrey Mfg. Co.
Lewistown Fdry. & Mach. Co.
*Raymond Pulverizer Division of the Combustion Engineering Co.
*Smidth & Co., F. L.
Sprout, Waldron & Co.
Straub Mfg. Co.
*Traylor Engr. & Mfg. Co.
*Universal Crusher Co.
*Williams Patent Crusher & Pulverizer Co.

Mills (Pug)
McCarter Iron Works, Inc.

Mixers (Asphalt)
Hetherington & Berner, Inc.
*Link-Belt Co.
McCarter Iron Works, Inc.
*Warren Bros. Roads Co.

Mixers (Concrete)
Anchor Concrete Machy. Co.
*Kent Machine Co.
*Koehring Co.
*Link-Belt Co.
Miles Mfg. Co.
*Multiplex Concrete Machinery Co.
*Stearns Mfg. Co.

Motor Control
*General Electric Co.

Motor Trucks
Sterling Motors Corp.

Motors and Generators
*General Electric Co.
Harnischfeger Corp.

Motors (Electric)
*General Electric Co.

Motors (Internal-Combustion) (See Engines — Internal-Combustion)

Moulds and Forms (Concrete)
Anchor Concrete Machy. Co.
Dunn Mfg. Co., W. E.
*Kent Machine Co.
*Multiplex Concrete Machinery Co.
R & L Concrete Machy. Co.
*Stearns Mfg. Co.

Nozzles (Gravel Washing)
*Deister Concentrator Co.

Nozzles (Hydraulic) (See Guns—Hydraulic)

Nozzles (Spray)
*Deister Concentrator Co.
*Link-Belt Co.

Outdoor Lighting Equipment
*General Electric Co.

Packings
*Cincinnati Rubber Mfg. Co.
Quaker City Rubber Co.

Pallets
Anchor Concrete Machy. Co.
Commercial Shearing & Stamping Co.
*Multiplex Concrete Machinery Co.
*Stearns Mfg. Co.

Pans (Wet and Dry)
Jackson & Church Co.

Paving Mixers
*Jaeger Machine Co.
*Koehring Co.

Perforated Metal Plates
Chicago Perforating Co.
*Hendrick Mfg. Co.
*Sprout, Waldron & Co.

Pipe, Dredge (Floating and Shore)
*Chicago Bridge & Iron Co.
Frog, Switch & Mfg. Co.
Naylor Pipe Co.
Taylor Forge & Pipe Works

Pipe Flanges
Frog, Switch & Mfg. Co.
Hetherington & Berner, Inc.
Naylor Pipe Co.
Taylor Forge & Pipe Works

Pipe Fittings
Hetherington & Berner, Inc.

Pipe Forms (Concrete)
*R & L Concrete Machy. Co.

Pipe Machines (Concrete)
*R & L Concrete Machy. Co.

Pipe (Spiral)
Naylor Pipe Co.
Taylor Forge & Pipe Co.

Pipe (Water, Gas, Low Pressure Steam)
Hetherington & Berner, Inc.

Pipe (Welded)
*Chicago Bridge & Iron Co.
Naylor Pipe Co.
Taylor Forge & Pipe Co.

Plug Valves (See Valves)

Pneumatic Conveying Systems (See Conveyors—Pneumatic)

Pneumatic Drills (See Drills, Rock)

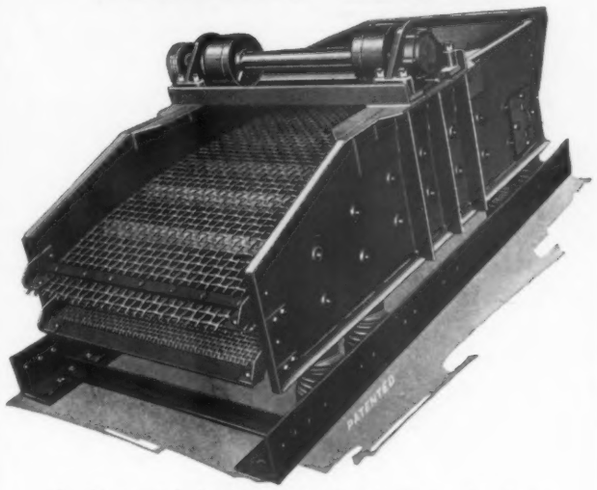
Poidometers
Schaffer Poidometer Co.

Portable Conveyors
*Barber-Greene Co.
*Fuller Company
Haiss Mfg. Co., Geo.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.

Portable Crushing and Screening Plants
*Austin-Western Road Machy. Co.
*Barber-Greene Co.
*Diamond Iron Works
*Jeffrey Mfg. Co.
*Link-Belt Co.
*McLanahan and Stone Corp.
*Universal Crusher Co.
*Williams Patent Crusher & Pulverizer Co.

*See also detail information in the 1939 Pit and Quarry HANDBOOK.

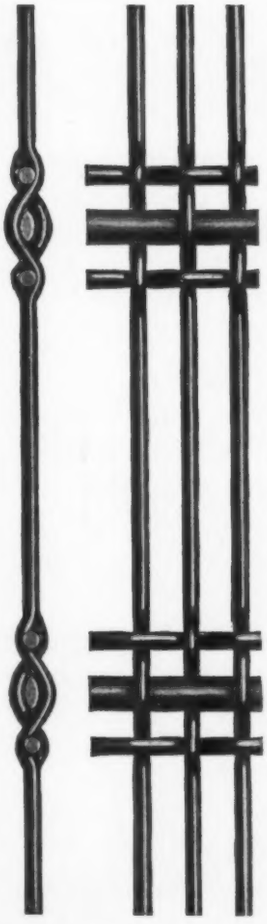
DEISTER PLAT-O VIBRATING SCREEN



1. Powerful high-speed vibrating mechanism.
2. Screen cloth automatically held under uniform tension.
3. Any one screening surface changed without disturbing remaining decks.
4. Cushioned vibration.

DEISTER MACHINE CO.

1933 E. WAYNE ST. FT. WAYNE, IND.



STA-TRU

Long-Mesh Woven Wire Screens

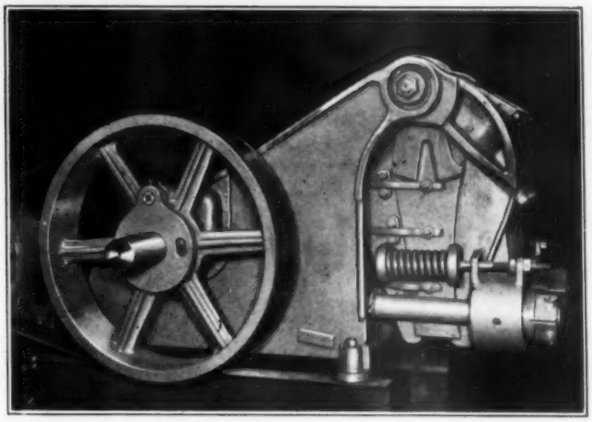
made to work under tension and vibration.

The straight stay-bars carry ALL the tension. The crimps in the round wires can not be stretched or broken. The screen can not be caused to sag or split by the pull of the tensioning device.

LUDLOW-SAYLOR WIRE CO. ST. LOUIS

KUE-KEN

BALANCED CRUSHERS



All-steel KUE-KEN Crusher: *The only crusher that crushes without abrasion. Operators are reporting almost unbelievable economy of jaw plates. It looks as though we won't get rich selling jaw plates.*

crush faster
use less power
wear less
weigh less
take less foundation

Faster crushing because rocks are crushed with a downward motion. They are helped on their way, not hindered. Less power used because abrasion is eliminated. No rubbing between the jaws at the moment of crushing. Less wear because crushing is done without rubbing and all mechanism runs in a sealed and filtered oil bath. Less weight because of all-steel construction and exclusive design permits every force to be cancelled by an equal and opposite force. No need for heavy frames. Less foundations because of perfect balance. Every moving part balanced by another moving in the opposite direction. Write today for Bulletin 600. Describes KUE-KEN crushers of capacities from 5 tons per hour to 100 tons per hour.

STRAUB MFG. CO.

528 Chestnut St., Oakland, Calif.

BUYERS' GUIDE

A Directory of Pit and Quarry Advertisers Indexed According to Product.

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Portable Loaders (See Loaders and Unloaders)

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*Universal Crusher Co.

Powder, (Black, Blasting) (See Explosives)

Power Feeders
Miles Mfg. Co.

Power Shovels (See Shovels, Electric, Internal-Combustion and Steam)

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Power Tampers (Concrete)
Anchor Concrete Machy. Co.
*Kent Machine Co.
Miles Mfg. Co.
*Multiplex Concrete Machinery Co.
*Stearns Mfg. Co.

Power Units (Internal Combustion)
Caterpillar Tractor Co.
Cummins Engine Co.
National Supply Co. of Del.
*Nordberg Mfg. Co.
Superior Diesel Engine Division of The National Supply Co.

Pre-formed Wire Rope
Broderick & Bascom Rope Co.
*Hazard Wire Rope Division of The American Chain & Cable Co.

Press Machines (Hand, Concrete)
Anchor Concrete Machy. Co.
*Kent Machine Co.
*Multiplex Concrete Machinery Co.
*Stearns Mfg. Co.

Presses (Brick & Block)
Jackson & Church Co.

Proportioning Equipment
*Blaw-Knox Co.
Jackson & Church Co.
*Jaeger Machine Co.
*Merrick Scale Mfg. Co.
Schaffer Poidometer Co.

Pulleys
*Link-Belt Co.
*McLanahan and Stone Corp.
Sprout, Waldron & Co.

Pulleys (Magnetic)
Sprout, Waldron & Co.

Pulleys (Wing)
Sprout, Waldron & Co.

Pulverized Fuel Systems
*Hardinge Co.
*Raymond Pulverizer Division of the Combustion Engineering Co.

Pulverizers (See also Crushers, Mills, etc.)
*American Pulverizer Co.
*Austin-Western Road Machy. Co.
*Hardinge Co.
*Jeffrey Mfg. Co.
Lewistown Foundry & Machine Co.
New Holland Machine Co.
*Raymond Pulverizer Division of the Combustion Engineering Co.
*Smidth & Co., F. L.
Straub Mfg. Co.
Traylor Engr. & Mfg. Co.
*Universal Crusher Co.
*Williams Patent Crusher & Pulverizer Co.

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Pumps (Air-Lift)
*Fuller Company

Pumps (Bulk Cement)
*Fuller Company

Pumps (Cement Slurry)
*Morris Machine Works
*Smidth & Co., F. L.

Pumps (Centrifugal)
Gardner-Denver Co.
Hetherington & Berner, Inc.
*Jaeger Machine Co.
Kansas City Hay Press Co.
*Morris Machine Works

Pumps (Dewatering)
*Morris Machine Works

Pumps (Dredging)
Bucyrus-Erie Co.
Hetherington & Berner, Inc.
Kansas City Hay Press Co.
*Morris Machine Works

Pumps (Sand and Gravel)
Hetherington & Berner, Inc.
Kansas City Hay Press Co.
*Morris Machine Works

Pumps (Turbine)
*Morris Machine Works

Pumps (Vacuum)
*Fuller Company

Pumps (Vertical)
*Morris Machine Works

Pumps (Well)
*Morris Machine Works

Racks (Curing)
Anchor Concrete Machy. Co.
*Kent Machine Co.
*Multiplex Concrete Machinery Co.
*Stearns Mfg. Co.

Railways (Electric)
*General Electric Co.

Ready-Mixed Concrete Plants
*Jaeger Machine Co.

Recording Instruments & Meters
*General Electric Co.

Relays
*General Electric Co.

Rheostats
*General Electric Co.

Rock Drills (See Drills—Rock)

Rod Mills
*Hardinge Co.
Jackson & Church Co.
*Traylor Engr. & Mfg. Co.

Rods (Welding)
Stulz-Sickles Co.
Wall-Colmonoy Corp.

Rope (Wire) (See Wire Rope)

Sand and Gravel Handling Equipment
*Jeffrey Mfg. Co.
*Link-Belt Co.
*McLanahan and Stone Corp.

Sand-Lime-Brick Machy.
*Hardinge Co.
Jackson & Church Co.

Sand Separators
*Jeffrey Mfg. Co.
*Link-Belt Co.
McLanahan and Stone Corp.
Simplicity Engineering Co.
Smith Engr. Works

Sand Settling Tanks
*Chicago Bridge & Iron Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Nordberg Mfg. Co.
Smith Engr. Works

Scales
*Merrick Scale Mfg. Co.

Scrapers (Power Drag)
*Austin-Western Road Machy. Co.
*Link-Belt Co.
*Sauerman Bros., Inc.

Scrapers (Wagon)
*Bucyrus-Erie Co.

Screens
Bacon, Inc., Earle C.
Chicago Perforating Co.
Cleveland Wire Cloth & Mfg. Co.
*Deister Concentrator Co.
*Deister Machine Co.
*Diamond Iron Works
*Eagle Iron Works
Frog, Switch & Mfg. Co.
*Haiss Mfg. Co., Geo.
*Hardinge Co.
*Hendrick Mfg. Co.
*Jeffrey Mfg. Co.
Lewistown Foundry & Machine Co.
*Link-Belt Co.
Ludlow-Saylor Wire Co.
Manganese Steel Forge Co.
McLanahan and Stone Corp.
*Nordberg Mfg. Co.
*Robins Conveying Belt Co.
*Roebling's Sons Co., John A.
Simplicity Engineering Co.
Smith Engr. Works
Sprout, Waldron & Co.
Straub Mfg. Co.
*Traylor Engr. & Mfg. Co.
Twin City Iron & Wire Co.
*Tyler Co., W. S.
*Universal Crusher Co.

Screens (Vibrating or Shaking)
*Austin-Western Road Machy. Co.
*Barber-Greene Co.
*Deister Concentrator Co.
*Deister Machine Co.
*Diamond Iron Works
*Jeffrey Mfg. Co.
Lewistown Foundry & Machine Co.
*Link-Belt Co.
McLanahan and Stone Corp.
New Holland Machine Co.
*Nordberg Mfg. Co.
*Robins Conveying Belt Co.
Screen Equipment Co.
Simplicity Engineering Co.
Smith Engr. Works
Sprout, Waldron & Co.
Straub Mfg. Co.
*Tyler Co., W. S.
*Universal Crusher Co.
*Williams Patent Crusher & Pulverizer Co.

Scrubbers
*Link-Belt Co.
*McLanahan and Stone Corp.
*Traylor Engr. & Mfg. Co.
*Tyler Co., W. S.

Semi-Trailers (Side or End-Dumping, Quarry)
*Easton Car & Construction Co.

Separators (Air) (See Air Separators)

Separators (Slurry)
*Smidth & Co., F. L.

Sheaves
*Eagle Iron Works
Frog, Switch & Mfg. Co.
*Haiss Mfg. Co., Geo.
Hetherington & Berner, Inc.
*Jeffrey Mfg. Co.
*Link-Belt Co.
McLanahan and Stone Corp.
Sprout, Waldron & Co.

Shovels (Electric, Internal-Combustion and Steam)
*Austin-Western Road Machy. Co.
*Bay City Shovels, Inc.
*Bucyrus-Erie Co.
Harnischfeger Corp.
*Koehring Co.
*Link-Belt Co.
Marion Steam Shovel Co.
Northwest Engineering Co.
Thew Shovel Co.

Silos
*Chicago Bridge & Iron Co.
Marietta Concrete Corp.
McCarter Iron Works, Inc.
*Smidth & Co., F. L.

Skids
*Easton Car & Construction Co.

Skip Hoists and Skips
Hetherington & Berner, Inc.
*Jeffrey Mfg. Co.
*Link-Belt Co.
McCarter Iron Works, Inc.
*Robins Conveying Belt Co.

Sleeves (Dredge)
*Cincinnati Rubber Mfg. Co.
Quaker City Rubber Co.

Spaders
Gardner-Denver Co.

Speed Reduction Units
*General Electric Co.
*Link-Belt Co.

Spouts (See Chutes and Chute Liners)

Sprays
*Deister Concentrator Co.

Sprockets and Chain
*Jeffrey Mfg. Co.
*Link-Belt Co.
Sprout, Waldron & Co.
Straub Mfg. Co.

Stackers
*Jeffrey Mfg. Co.

Starters (Automatic Motor)
*General Electric Co.

Steel (Alloy)
(See Alloys—Steel)

Steel (High Tensile)
Manganese Steel Forge Co.

Steel (Open Hearth)
Manganese Steel Forge Co.

Steel Plate Construction
*Chicago Bridge & Iron Co.
Hetherington & Berner, Inc.
Manganese Steel Forge Co.
McCarter Iron Works, Inc.
Sprout, Waldron & Co.

Stone Grapples
Owen Bucket Co.

Storage Equipment
*Chicago Bridge & Iron Co.
*Haiss Mfg. Co., Geo.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Marietta Concrete Corp.
*Sauerman Bros., Inc.

Switchboards (Electric)
*General Electric Co.

Switches (Electric)
*General Electric Co.

Switches (Safety)
*General Electric Co.

Tamp Machines (Hand, Concrete)
Anchor Concrete Machy. Co.
*Kent Machine Co.
*Multiplex Concrete Machinery Co.
*Stearns Mfg. Co.

Tanks
*Chicago Bridge & Iron Co.
*Hendrick Mfg. Co.
Jackson & Church Co.
*Link-Belt Co.
Louisville Drying Machy. Co.
McCarter Iron Works, Inc.
*Traylor Engr. & Mfg. Co.

Tanks (Elevated Steel)
*Chicago Bridge & Iron Co.

Tanks (Sand-Settling)
*Chicago Bridge & Iron Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Smith Engr. Works

Testing Sieves and Shakers
*Hendrick Mfg. Co.
*Tyler Co., W. S.

Tile Machines
Miles Mfg. Co.

Tools (Drill) (See Drilling Accessories)

Tractors
Caterpillar Tractor Co.

Track Shifters
*Nordberg Mfg. Co.

Trailers
Sterling Motors Corp.

Trailers (Dump)
*Le Tourneau, Inc., R. G.
*Link-Belt Co.
Sprout, Waldron & Co.

Gelatin (See Explosives)

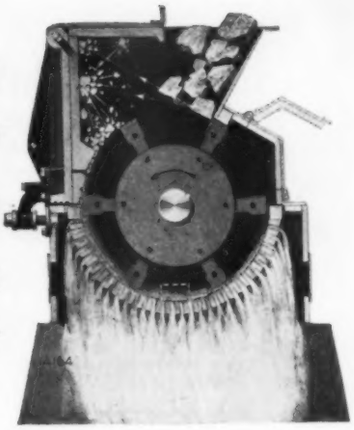
*See also detail information in the 1939 Pit and Quarry HANDBOOK.

There is only one DUMPSTER .....It's DEMPSTER

Model "BG" (Below Grade), is only one of the many types of Hoisting Units mounted on trucks for handling detachable buckets included in the DUMPSTER line.
Model "BG" is equipped to lift loaded buckets from 30 ft. below grade.
Detachable Buckets are furnished in sizes from 1 cu. yd. to 6 cu. yds. capacity, in Drop-Bottom and Water-Tight Types.

DEMPSTER BROS., INC.
KNOXVILLE, TENN. *(There's a Dealer near you)*

WHEN YOU THINK OF REDUCTION .. THINK of JEFFREY



If you want to produce a better product, and do it with less cost . . . we suggest you give Jeffrey Swing Hammer Pulverizers a try. They will give you dependable day-in and day-out service reducing limestone, shale, clay, chalk, marl, gypsum, phosphate rock and asbestos rock.

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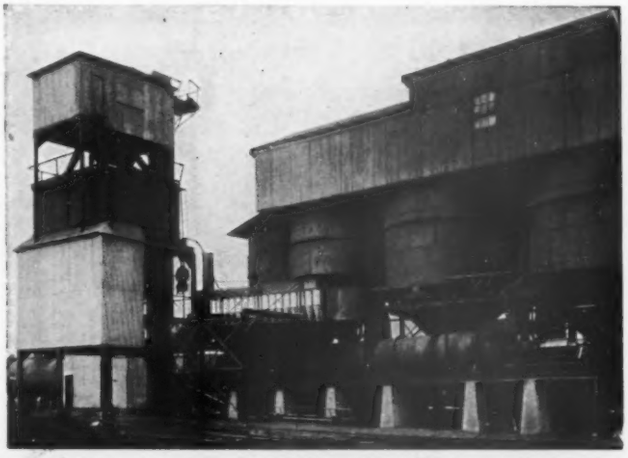

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HOT MIX —— COLD MIX
—— OR ——
COMBINATION UNIT FOR BOTH TYPES
CAPACITY DESIGN AND ARRANGEMENT TO MEET ANY REQUIREMENTS

Designed and Built
—— By ——
WARREN BROTHERS ROADS CO.
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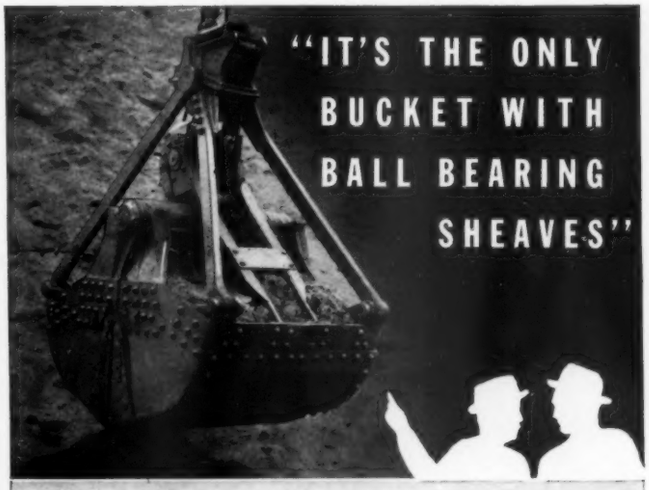
Boston Massachusetts



Yes, sealed ball bearing sheaves keep lubrication in and dirt out, to prevent excessive wear and prolong the life of the bucket. In addition Blaw-Knox Buckets make generous use of tough alloy steels to avoid excessive dead weight and provide worthwhile savings in rehandling costs. Write Blaw-Knox today for Bulletin 1606.

16

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Digging and Rehandling **BUCKETS**

BUYERS' GUIDE

A Directory of Pit and Quarry Advertisers Indexed According to Product.

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Sterling Motors Corp.

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*General Electric Co.

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Worm Gears (See Gears and Pinions)

*See also detail information in the 1939 Pit and Quarry HANDBOOK.

Rocks are taking the *"Hardest Way"* when they tackle an

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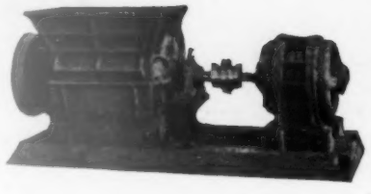

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Get the **McCARTER**

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When you work a BAY CITY in rock it will out-perform because of its heavy-duty features—One-piece powerful chain crowd • Unit-cast alloy steel bases • Long, wide crawlers • Strong electric welded boom • Alloy steel cast dipper front and back • Straddle dipper sticks and rugged shipper shaft. These are only a few outstanding advantages—let us tell you the full story.

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BAY CITY SHOVELS

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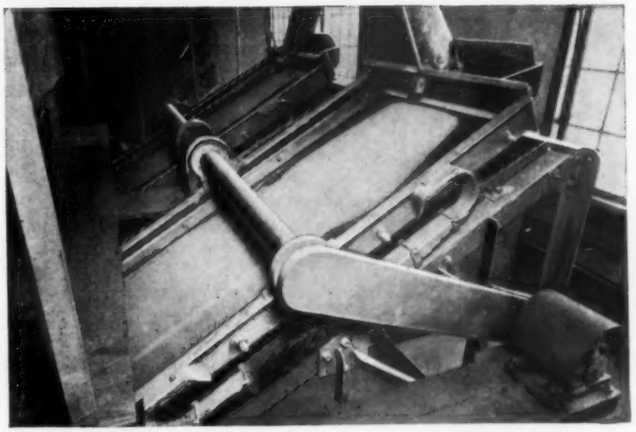

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DIG, HAUL & DUMP

for a few cents per cubic yard

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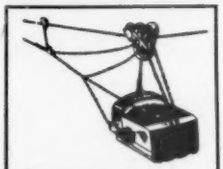
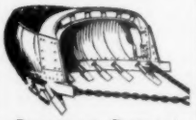


Sauerman Slackline Cableway Bucket



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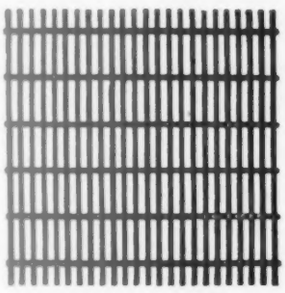

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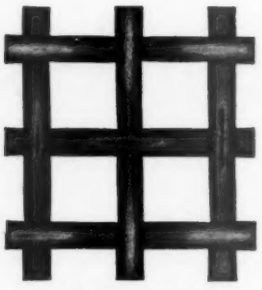

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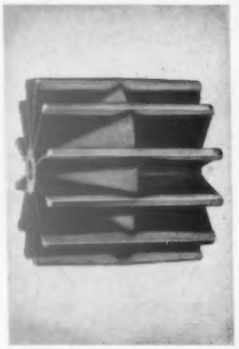

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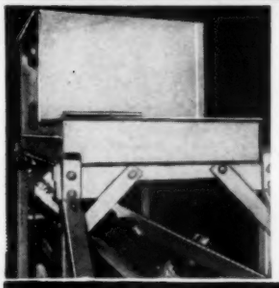

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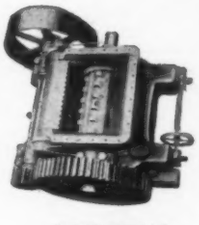

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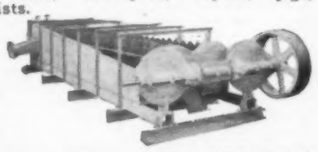

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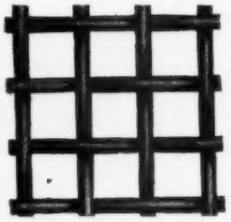

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te'l their own story on the job.

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"Twin City" screens will knuckle down to any job you give them. Try them the next time you need screens.

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PITTSBURGH NEW YORK CHICAGO

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1—¾ yd. Blaw-Knox bucket.
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30 Ton, 4 compartment Bin.
26' Reject Conveyor (Slightly used, as good as new).
NEW 15 x 36 Gruendler Roller Bearing Jaw Crusher.
NEW 11 x 20 Bronze Bearing Jaw Crusher.
NEW 24 x 36 Plain Bearing Jaw Crusher.
NEW 30 x 18 Roller Bearing Double Roll Crusher.
1—USED 5 ton per hour Day Pulverizer.
1—USED 10 to 15 ton per hour Gruendler Pulverizer.
1—NEW 10 to 15 ton per hour Pulverizer.
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1—36 x 16' Trunnion type Revolving Screen with Dust Jacket.

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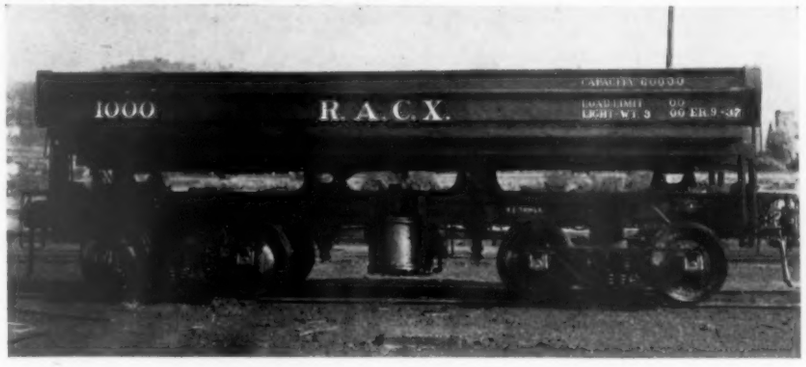
Box 975
St. Louis — Missouri



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18-Kilbourne & Jacobs 16 cu. Yard air operated Dump Cars, fully rebuilt and available for immediate inspection and delivery, quotations and prints gladly furnished.

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SYNCH. MOTOR GENERATORS

750 KW WEST., 250 V., 2400 A.C., 900 RPM.
300 KW G.E., 250 V., 2300/4000 A.C., 1200 RPM.
200 KW G.E., 250 V., 2300/4000 A.C., 1200 RPM.
200 KW G.E., 550 V., 2300/4000 A.C., 1200 RPM.
150 KW WEST., 250 V., 2300/4000 A.C., 1200 RPM.
100 KW G.E., 250 V., 2300 A.C., 1200 RPM.

AIR COMPRESSORS

1302' I-R, PRE-2, Dir.Con. 440 V. Syn. Mt. 100 lb'
1052' I-R, XCB, Belted 2200 V. Syn. Mt. 100 lb.

Each unit listed above is owned by us and is only a small part of our large stock consisting of Synchronous Converters, Tranformers, Motors, and Trolley and Battery Locomotives.

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Incorporated
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SPECIALS MUST MOVE QUICKLY

2—1578 CFM, I.R. PRE 2
Synchronous Motor Driven
2—1300 CFM, C.P. OCE
Synchronous Motor Driven
1—1300 CFM, Sullivan, WN3
Synchronous Motor Driven

Also a full line of **Crushers; Screens; Dryers; Kilns; Ball-Mills; Pulverizers; Air Classifiers;** Etc.

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CRUSHERS—ELEVATORS—SCREENS SAND WASHERS—PUMPS CONVEYORS

1—7½"x13" CHAMPION No. 3 Jaw Crusher.
4—BRAND NEW Jaw Crushers 9"x15" and 10"x20".
1—9"x16" CLIMAX No. 2 Jaw Crusher.
1—12"x26" CHAMPION No. 6 Jaw Crusher.
1—No. 19 KENNEDY Fine Reduction Crusher.
1—No. 1 STURTEVANT Ring Roll Mill.
1—Pr. 24"x14" WEBB CITY Crushing Rolls.
1—4'x8' LINK-BELT Double Deck Vibrating Screen.
2—M-20 QUAKER CITY Hammer Mills.
1—No. 2 MEAD Disc Mill.

JOHNSON AND HOEHLER, INC.
Lansdowne, Penna.

Jaw Crushers—4"x8" up to 66"x84".
Crushing Rolls—16"x10" up to 54"x24"—Gyratory Crushers
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Swing Hammer Mill.
Rotary Fine Crushers—No. 1, No. 0.
Direct Heat Rotary Dryers—3½'x25', 4'x30', 5'x30', 5½'x40', 6'x50', 7'x50' and 8'x50'.
Semi-indirect heat Dryers—4'x30', 4½'x26', 5'x30' and 8½'x75'.
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Hardinge—Marcy & Fuller-Lehigh Mills.
Raymond Mills—No. 00, No. 0 and No. 1 and No. 5 roll
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Vibrating Screens—Air Separators.
1—4'x4' Ball Mill.
New Dryers built for all purposes.

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Freight Cars; any kind
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Relaying Rails
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"Anything containing IRON or STEEL"

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USED EQUIPMENT

9 x 18 DIAMOND Roller Bearing Jaw Crusher
10 x 20 " " " " "
10 x 36 " " " " "
15 x 36 " " " " "
2'0" x 4'0" single deck DIAMOND vibrating screen

NEW EQUIPMENT

1—DIAMOND 9 x 16 Bronze Bearing Jaw Crusher mounted on truck with 15-20 H.P. engine. Special price for quick sale.

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Minneapolis — Minn.

8A, 10B Telsmith, No. 19 & 25S Kennedy Gyratory Crushers.
Swintex Cutters, 25'8", 50'10", 45'15" pipe.
4 Gardner Denver Derrick Drills, Model 21.
6, 8, 10, 12" Sand & Gravel Pumps. Other Centrifugals.
Conveyor Equipment 14" to 36". Belt & Portable.
Barber-Greene Loaders Models 21, 25, 42, 57 & 82.
Vibrating & Rotary Screens, all types & sizes.
1 Yd. Koppel, 4 Yd. Western 36" Ga. Dump Cars.
20—1½ Yd. 30" Ga. Day Evans all steel Dump Cars.
2—18 ton, 2—21 ton 36" Ga. Davenport ST Locos.
1½ Yd. Page "C" Dragline Bucket. Ask for Bulletin 47.

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ELECTRICAL MACHINERY

Motors and Generators, A.C. and D.C. for sale at attractive prices. New and Rebuilt. All fully guaranteed. Write for List and Prices.

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FORT WAYNE, IND.

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FOR SALE A Good Time to Buy

2 Steel barges 100x30 and 144x33 steam.
2 Dewaterizers Link-Belt 400 TPH.
2 Jaw crushers 60x84, also 2 Kennedy No. 25.
2 Dragline buckets 2½ yd. manganese.
2 Page draglines No. 420—3½ yd. electric.
2 Shovels P&H 900 diesel—cl. 100 electric.
2 Lime hydrators Schulthress-Kritzer.

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Koehring No. 501 dragline; good condition.
Austin Badger 1¼ yd. shovel; 3 yrs. old.
Sullivan 220 ft. compressor; rebuilt.
Haiss loader, 5 yrs. old; overhauled.
28 ft. conveyor; 16 in. belt; LeRoi engine.
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All sizes shovels, cranes and tractors for rent.

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WE LOOK INTO THE EARTH

By using Diamond Core Drills We drill for Limestone, Gypsum, Talc. Fire Clay. Coal, and all other minerals.

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Drilling Contractors
Pittsburgh, Pa.

FOR SALE

New Elevator Buckets of all sizes. Also Bins and Tanks, Bolted or welded.

C. L. FIELDER COMPANY
Liberty Trust Bldg. Roanoke, Virginia

FOR SALE By Owner

Morris 6" water pump.
8" Spiral water pipe.
8" Flap valve.

NORTHWESTERN GRAVEL CO.
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O. C. HOFFMAN, Pres. L. H. HOFFMAN, Treas.

DIAMOND CORE DRILLING
HOFFMAN BROS. DRILLING COMPANY
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We drill for any mineral. We have more than forty steam, electric and gasoline drills, adapted for any job. Satisfactory cores guaranteed. Our prices are right.
Established 1902 - - - - - Telephone No. 382

SAVE

Bolted type steel bins will cost you less erected than ordinary wood bins.

New and Used Pipe and Tubing

Jos. Greenspon's Son Pipe Corp.
Natl. Stock Yds. (St. Clair Co.) Ill.

DIESEL ENGINES FOR SALE

Fairbanks Morse, 10, 15, 20, 35, 37½, 60, 75 and up to 960 H. P.
Worthington 50 H. P.
150 H. P. Winton.
100 H. P. Nordberg Diesel and a number of the best makes. Prices and terms convenient to buyer.

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CHANCE OF A LIFE-TIME

I am offering 25% interest in rock business for services of party capable of taking complete charge of mining and crushing plant who can furnish the necessary mining equipment. Give comprehensive information in your reply as to age, experience, past connections, present connections if any, equipment you have, etc. Address Box 1106

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Bucyrus-Erie Gas Crane, Serial 4229, 45' boom. Good condition, $1,250.00.

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Chattanooga, Tennessee

WANTED

Equipment Salesman — Southern Indiana Territory. Must be familiar with and able to SELL dirt moving, rock drilling, paving and construction equipment in general. Prefer man having 5 years minimum experience machinery sales. Send full particulars, age, experience, qualifications, photograph. Replies held in strictest confidence.

Send replies to
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WANTED

To buy Crawler Gasoline Crane, 40' to 50' boom, suitable for handling one yard Clamshell bucket. Must be in good condition.

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FOR SALE

DRAGLINE BUCKET

1½ yard General Purpose, like new
Also some sizes of Clamshells

The Wellman Engineering Company
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WANTED

Sales Engineer familiar with crushing and screening phase of the Road Machinery and Allied Industries.

Prefer man with technical education and training but this not absolutely essential. Desire man who can make sales sketches and assist in preparation of sales proposals, leading eventually to sales correspondence and special field sales work.

A good opportunity for one who has initiative and ambition along sales engineering lines.

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Packing and bag house foreman with seven years experience, in operating, packing and loading departments, desires a permanent connection with progressive cement company. Qualified for installation, operation, and maintenance of Bates packers. Experienced in supervision of organized labor. Three years of mechanical engineering in a state university. Thirty-one years of age and married. References. Open for immediate engagement. Address

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One 10 to 15 ton Crane. Overhead traveling Crane. 50 feet span from center rail to center rail. 110 Volt D.C.

COMOLLI GRANITE COMPANY
Elberton Georgia

Middle West Stone Producer proposes to build:

1 Cupola Rock Wool Plant

and

2 Lime Kilns with Hydrating Machinery with capacity of about 1½ tons per hour.

WHAT HAVE YOU IN THE WAY OF EQUIPMENT FOR SUCH INSTALLATIONS?

Send replies to

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Cement Plant Operator. General experience in plant operation especially in burning, for plant in Bolivia, South America.

Apply to **E. N. Gorman, P. O. Box 286, Church Street Annex, New York City, N. Y.**

Stating experience, references, and salary desired.

WANTED

Stone Plant and Quarry Foreman. Must be thoroughly familiar with all phases of operations including Drilling, Blasting, Equipment maintenance and repair. Must be capable of handling men. State age, experience, qualifications, references and salary expected in first letter.

Send replies to
BOX 1109
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POSITION WANTED

University graduate chemist, 36 years old, married, with experience of 14 years in capacities of Asst. Super. to Pres. & Gen. Mgr. of a crushed stone and limestone quarry and 13 years as a concrete brick and block mfr., desires a position as equipment salesman or in the sales, operating or executive dept. of a reliable cement, lime, aggregates or allied industry company. East preferred. Address

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16—20 yd. Air Dump Cars, Magor, S.G.
4—20 yd. Air Dump Cars, Koppel, S.G.
36—5 yd. Hand Dump Cars, Western, 36" ga.
1—1000 G.P.M. Pump, 300' hd., 100 H.P., 3/60/2200.
1—700 G.P.M. Pump, 200' hd., 50 H.P., 3/60/2200.
1—10" AMSCO Manganese Pump.
1—Compressor, 750 C.F.M., I-R Imperial 10, Steam.
12—Hoist Motors, new, 50 H.P. and 25 H.P., 3/60/440.
1—Tube Mill, 5'x22' Allis Chalmers.
1—25-ton Industrial Locomotive Crane, 50' boom.
1—300 KVA Fairbanks Morse Diesel engine generator, 3/60/480.
1—170 KVA Fairbanks Morse Diesel engine generator, 3/60/460.
2—862 H.P. New Casey Hedges Longitudinal Tube Boilers, never used.
Rails, Relaying; all sections. Cars, Hopper, Gondola, Ore, Tank, Flat, etc. Locomotives, all capacities and types.

Send for complete machinery bulletin.

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2—Lorain 75-A comb. shovel-crane No. 3876 and 4210. 50'-0" booms.....$3750.00 ea.
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1—Lorain 60, No. 4074, 1 yd. Comb. Shovel-Crane. 70' boom.....$2875.00
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1—P&H Mod. 400, No. 3954, ¾ yd. shovel $2150.00
1—Universal Truck Crane No. 1310 mounted 4 speed Mack.....$1950.00
1—Whitcomb 4 Ton, 24" ga. Gasoline locomotive. Like New.....$395.00
2—Whitcomb 6 Ton, 24" ga. Gasoline locomotives. Good .....$350.00 ea.
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Hundreds of other items equally as attractive. We pay Highest Cash Prices for Modern Used Equipment. What do you have to offer?

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R. H. Boyer, Mgr. Equip. Div.
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SHOVEL—Steam, Marion 100 on Caterpillars; 3½ cu. yd. Dipper excellent condition.

LOCOMOTIVE — Steam, American 40 ton, four wheel, saddle tank, overhauled.

CRANE—Steam, Ohio 20 ton capacity, double drum, bucket operating, 50' boom, rebuilt.

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SAND WASHING PLANT
PRACTICALLY NEW SAND WASHING PLANT
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At exceptionally low price. Consisting of trap with grizzly, 20" x 110' sectional steel conveyor, 50-yard steel bin with structural steel superstructure for supporting No. 7 settling tank. Shaker screen 30" x 10', 40 H. P. gas motor, 22" x 18" roll crusher with 25 H. P. gas engine, 35' bucket elevator and 16" x 60' stock pile conveyor. Complete with all chutes, water piping and water pump.

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MINNEAPOLIS MINNESOTA

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CLAMSHELL: ½, ¾, 1, 1½ & 2 Yds.
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5 Ton BROWNHOIST, 30 ft. Boom Gas.
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1 Yd. NORTHWEST Gas & 7/8B2 Steamer
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6x8 Continuous Pebble Mill
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5'x22" HARDINGE CONICAL Dry Ball Mill
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4x16, 8x16, & 5x22 Tube Mills
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2x4½, 8x10 & 8x12 ROD MILLS

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14 ft., 8 ft. and 12 ft. Separators
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36x60 Fairmount & 36x16 Allis Chalmers
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30x10 Gruendler Roller Bearing

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KENNEDY: Nos. 19, 25, 27, 39 & 49

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7 Gasoline 15, 40, 60 & 100 H.P.
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8 Electric 20, 35, 50, 60, 100 & 150 H.P.

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72 Ton BLAW-KNOX 2 Compt.; also 250 ton
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400 BBl. Portable BUTLER Bulk Cement Bin with Fuller Full Automatic Electric Push Button Weigh Batcher

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52 H.P. GEN. ELEC. 3/60/220-440 v., 1200 rpm.
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Air: ¼ in. to 1½ in. Water: ¾ in. to 10 in.

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Steel Frames: 2,000 ft. 24 In., 30 In. & 36 In. Sections

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36 In. x 20 Ft., 3 Ft. x 30 Ft., 4 Ft. x 30 Ft., 34 In. x 30 Ft., 42 In. x 24 Ft., 5 Ft. x 30 Ft., 5 ft. x 16 Ft., 5 Ft. x 60 Ft., 6 Ft. x 60 Ft., 6 Ft. x 70 Ft., 70 In. x 40 Ft.

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STIFF LEG: 5 Ton 70 Ft. Boom, 15 Ton 100 Ft. Boom, 25 Ton 100 Ft. Boom, 75 Ton 135 Ft. Boom

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GASOLINE: 3 Ton, 5 Ton, 8 Ton, 12, 14 & 30 Ton
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VIBRATING: 2x4, 3x6, 2x8, 3x8, 3x5, 4x5, 4x8, 4x10, 48x72. HUMMER, ROTEX, NIAGARA & ROBINS, LINK BELT & HURON
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4 LINK-BELT A-60 In. Classifiers.
7 ALLEN Cones 4 Ft., 5 Ft., 6 Ft., 8 Ft. TELSMITH 12 Ft. by 2 Ft. 8 In. Screw Washer.

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12—50 Ton Cap. Battleship Gondolas.
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1—¾ yd. Gas 1—1½ yd. Electric
1—1 yd. Electric 3—2 yd., 3 yd. & 4 yd. Electric

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(Cable Address: "STANEQUIP" New York)
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1—10 Ton Gasoline Type, on Caterpillars.
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3—300 K.W. G.E. Rotary Converters.
1—300 K.W. G.E. Switchgear, Semi-Automatic (new).
3—300 K.W. G.E. Transformers.

GOLD MACHINE (In Wyoming)
1—Complete Ainley Placer Gold Machine, 4 Bowl, Dragline Operation.

LOCOMOTIVES (Steam)
4—51 Ton Baldwins, 17x24, Standard Gauge.
1—60 Ton American, 20x26, Standard Gauge.
2—77 Ton Baldwins, 19x26, Standard Gauge.

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1—½ Yd. Thew Electric Type S, Mining Crawler Type.
4—1¾ Yd. Marion Steam, Model 37, on Caterpillars.
1—3½ Yd. P & H Diesel 900, on Caterpillars.

PUMPS (Steam)
7—Camerons, 49 to 248 G.P.M.
1—Prescott Duplex, 8x5x10.

BUTLER BROTHERS
Producers of Iron Ore
137 East 8th St. St. Paul, Minn.

EQUIPMENT FOR SALE

1—Allis-Chalmers 7½ gyratory crusher.
2—Traylor Vibrator Feeders 40"x18"x16'0".
1—Dorr Washer Serial W-21-D, 25'-5"x16'x2'.
1—6' Manganese revolving screen 16' long.
1—Steel cased continuous bucket elevator 58"x39"x40' C.C.
1—Sloping steel elevator, very heavy, 25' long, perforated buckets 2½' x 7½" x 9" deep.
1—No. 8 McCully gyratory crusher.
1—100 H.P. Westinghouse induction motor.
1—200 H.P. Electric Hoist with 1,000' of ⅞" Cable with motor.
25—42" Fuller Mills with vertical induction motors.
1—57" Fuller Mill.
4—6'x22' Atlas Tube Mills Driven by
4—250 H.P. Synchronous motors and controls.
1—5'6"x20' Tube Mill, belt driven.
4—24"x60" bucket elevators 30'.
2—Rotary dryers 5½'x30'.
2—Rotary dryers 6'x30'.

Standard Equipment & Salvage Co.
2501 First Avenue, North
BIRMINGHAM, ALABAMA

SPECIAL OFFERING
of Standard Gauge
Saddle Tank Locomotives

All Thoroughly Reconditioned

Four—14x22" American 40 Ton.
One—15x22" Porter 40 Ton.
One—14x20" Porter 36 Ton.
One—14x20" Vulcan 36 Ton.
One—13x18" Porter 32 Ton.
One—12x18" American 26 Ton.

Very Attractive Prices

Also have large stock all industrial types, steam and gasoline.

Complete Stock List on Request.

BIRMINGHAM RAIL & LOCOMOTIVE COMPANY
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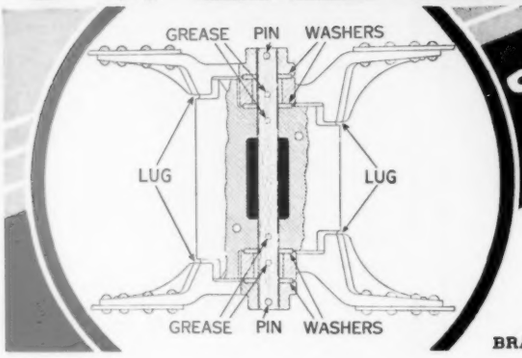

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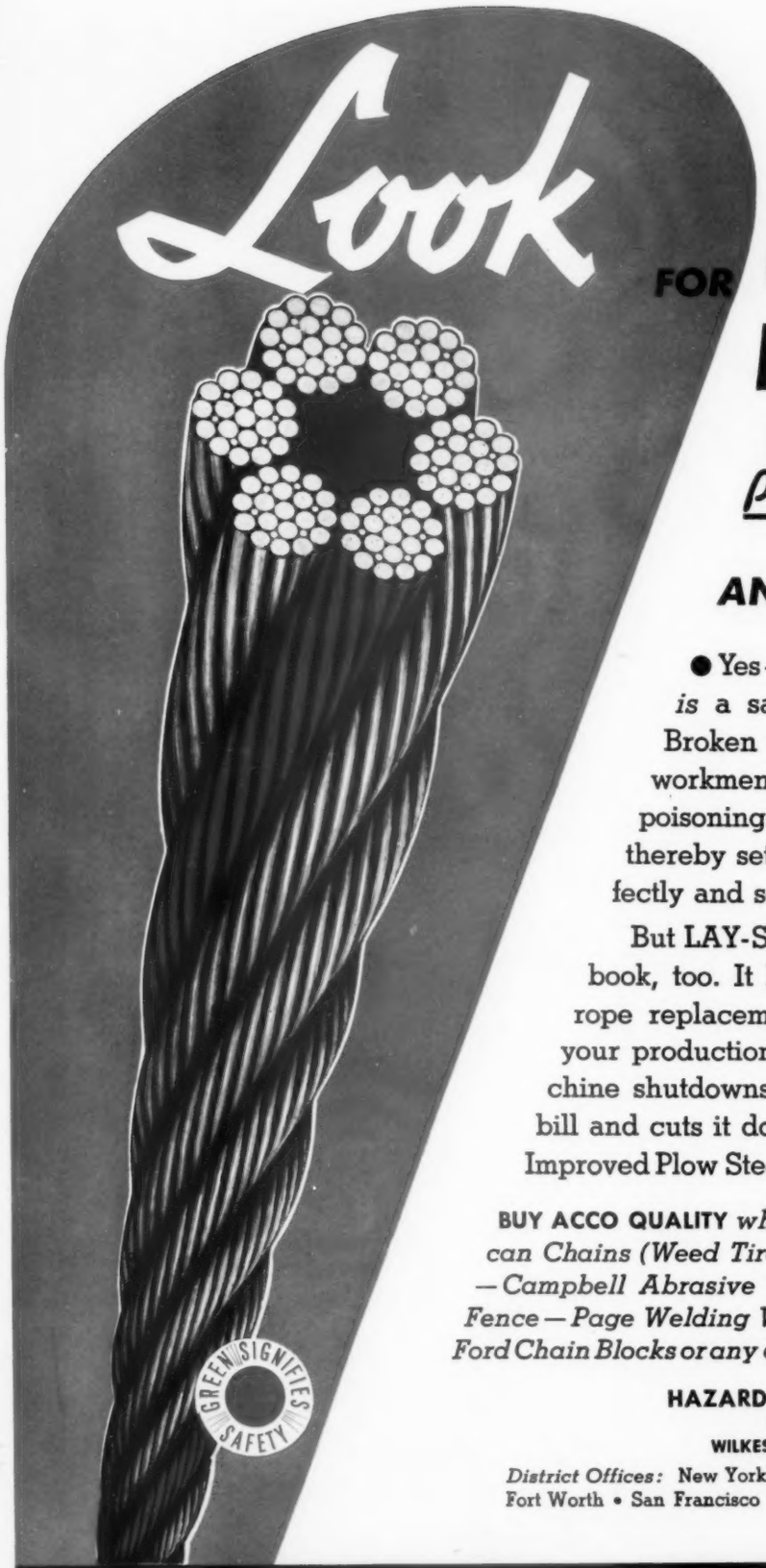

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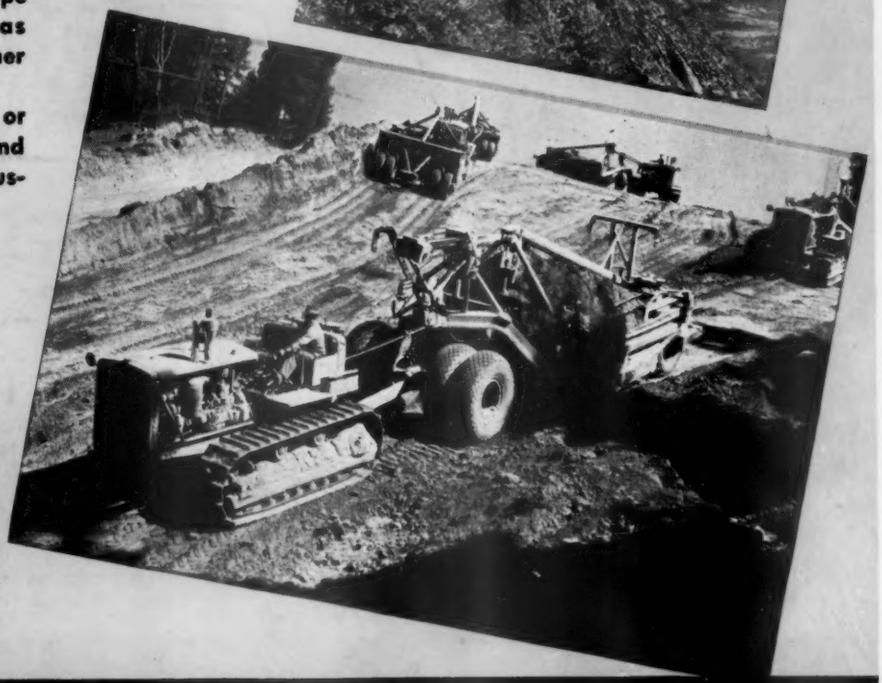

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